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Intel® Dialogic® System Software

Diagnostics Guide

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Revision History

This revision history summarizes the changes made in each published version of this document.

Document No.	Publication Date	Description of Revisions
05-1935-007	September 2006	Diagnostics Overview: Added a new section: Diagnostics Management Console (DMC). System Requirements: New chapter. Includes JRE requirement. Using the Diagnostics Management Console (DMC): New chapter. Debugging Software: This chapter now includes a new version of Troubleshooting Runtime Issues that contains an additional procedure for using the RTFManager GUI. Diagnostics Management Console (DMC) Reference: New chapter. RTFManager Reference: New chapter. Runtime Trace Facility (RTF) Reference: Added a new section: Configuring Remote RTF Logging.
05-1935-006	April 2006	Getver Reference: Chapter revised to document the new version of this tool. PDK Trace Reference: In Description, added information about which boards support the tool. Phone Reference: Removed reference to Audio Control tool. QScript Reference: Removed Audio Control tool and CASSignal Editor from the list of administrative utilities. Runtime Trace Facility (RTF) Reference: Updated Module Tag section and removed Table 3 since the most current list of modules is in the RTF configuration file. Updated module and label names in RTF Configuration File and Example RTF Configuration Files. Added information to maxbackups. Removed mention of binary trace output since it is now all text output. Removed the following line from the RTF configuration file: <!DOCTYPE RTFConfig SYSTEM "RTFConfig.dtd" >. Status Monitor Reference: Added an item to Guidelines: tool is not intended for use with boards that are configured for ISDN. Intel Telecom Subsystem Summary Tool Reference: Chapter revised to document the new version of this tool.
05-1935-005	January 2006	Diagnostics Overview: Added reference to CAS and ISDN trace information. Tracing Multiple ISDN Trunks Using Global Call: New chapter. GCEV_TRACEDATA Reference: Revised this chapter to include information about collecting ISDN trace information. Runtime Trace Facility (RTF) Reference: Updated this chapter to document the new version of RTF.

Document No.	Publication Date	Description of Revisions
05-1935-004	September 2005	Checking all the Boards in a System: A new section in Checking DM3 Architecture Boards. Tracing CAS Signaling Using Global Call: New chapter. Unsupported Boards: New section in Checking DM3 Architecture Boards. DM3post Reference: Added information about the -r (reset) option and about using DM3post to run POST on a chassis level. Dlgsnapshot Reference: Description was rewritten because the autodump feature is no longer enabled by default. Options section revised to include instructions for enabling autodump. GCEV_TRACEDATA Reference: New chapter. Running the PSTN Diagnostics Tool: Expanded Option Buttons and Command Buttons to list and describe all buttons. QScript Reference: New chapter. Runtime Trace Facility (RTF) Reference: Updated to include new Rtftool command, information about Intel Runtime Tracing Dispatcher service and procedure for using the Rtftool to export binary trace data into a readable file format. Glossary: Added this section.
05-1935-003	September 2004	Checking DM3 Architecture Boards: New chapter Diagnosing First Call Issues: New chapter Diagnosing PSTN Protocol Issues: New chapter Debugging Software: New chapter PSTN Diagnostics Tool Reference: New chapter Runtime Trace Facility (RTF) Reference: New chapter Intel Telecom Subsystem Summary Tool Reference: New chapter DebugView Reference: Removed this chapter QError Reference: Removed this chapter StrmStat Reference: Removed this chapter TSP Config Reference: Removed this chapter TSP Monitor Reference: Removed this chapter TSP Tracer Reference: Removed this chapter
05-1935-002	November 2003	Global changes: Removed the chapters about DM3Stderr, DM3Trace, and DM3Kdebug and all references to these tools. Diagnostics Overview: Added references to new diagnostic tools. How to Use This Publication: Updated chapter list to reflect additions and deletions. CAS Trace Reference: New chapter DebugAngel Reference: New chapter Dlgsnapshot Reference: New chapter PDK Trace Reference: New chapter Status Monitor Reference: New chapter TSP Config Reference: New chapter (previously in Administration Guide) TSP Monitor Reference: New chapter (previously in Administration Guide) TSP Tracer Reference: New chapter (previously in Administration Guide)
05-1935-001	November 2002	Initial version of document. Much of the information contained in this document was previously contained in the *DM3 Diagnostic Utilities Reference Guide*, document number 05-*1484-005*.

About This Publication

The following topics provide information about this publication:

- Purpose
- Intended Audience
- How to Use This Publication
- Related Information

Purpose

This guide describes the diagnostic tools included with the Intel® Dialogic® System Software release and explains how to use them.

Intended Audience

This information is intended for:

- Distributors
- System Integrators
- Toolkit Developers
- Independent Software Vendors (ISVs)
- Value Added Resellers (VARs)
- Original Equipment Manufacturers (OEMs)
- End Users

How to Use This Publication

Refer to this document after you have installed the hardware and the Intel Dialogic system software that includes the diagnostic tools.

The information in this guide is organized as follows:

- Chapter 1, "Diagnostics Overview" provides a brief overview of the diagnostic tools.
- Chapter 2, "System Requirements" lists the hardware and software requirements for using the diagnostic tools.

Each of the following chapters discuss diagnostic tasks. Details about the tool used to perform the task are provided in the tool reference chapters that follow these task chapters. This information is cross-referenced between the task and reference chapters.

- Chapter 3, "Using the Diagnostics Management Console (DMC)"
- Chapter 4, "Checking DM3 Architecture Boards"
- Chapter 5, "Diagnosing First Call Issues"
- Chapter 6, "Diagnosing PSTN Protocol Issues"
- Chapter 7, "Debugging Software"
- Chapter 8, "Tracing CAS Signaling Using Global Call"
- Chapter 9, "Tracing Multiple ISDN Trunks Using Global Call"

The remaining chapters provide reference information about the diagnostic tools. The chapters are organized in alphabetical order:

- Chapter 10, "CallInfo Reference" - The CallInfo tool detects call information using the DM3 board's Telephony Service Provider (TSP) resource.
- Chapter 11, "CAS Trace Reference"- The CAS Trace tool enables you to track the bit level transitions on a robbed bit or CAS line.
- Chapter 12, "DebugAngel Reference" - The DebugAngel tool provides low level firmware tracing to aid in low level debugging.
- Chapter 13, "Diagnostics Management Console (DMC) Reference" - The DMC provides a single portal from which you can launch diagnostic tools supplied with Intel® telecom software. The DMC also enables you to locate the log files produced by these tools and view them with the appropriate viewer.
- Chapter 14, "DigitDetector Reference" - The DigitDetector tool provides the ability to detect digits at the local end of a channel connection.
- Chapter 15, "Dlgsnapshot Reference" - The dlgsnapshot tool uses Intel Dialogic system software fault monitoring components to generate a core dump file when a Control Processor (CP), Signal Processor (SP), or Shared RAM (SRAM) fault is detected on a DM3 board.
- Chapter 16, "DM3Insight Reference" - DM3Insight is a tool used to capture message and stream traffic from the DM3 board device driver.
- Chapter 17, "DM3post Reference" - The DM3post tool can perform diagnostics on a stopped board at any time to detect and isolate possible hardware faults. DM3post can also run POST on the chassis level.
- Chapter 18, "GCEV_TRACEDATA Reference" - This chapter describes the data layout in the GCEV_TRACEDATA so that a parser can be designed.
- Chapter 19, "Getver Reference" - The getver (Get Version) software application outputs version information for files that are part of the Intel® Telecom software installation.
- Chapter 20, "ISDN Trace Reference" - The ISDNtrace tool provides the ability to track Layer 3 (Q.931) messages on the ISDN D-channel. ISDNtrace prints messages on the screen in real time.
- Chapter 21, "Intel Telecom Subsystem Summary Tool Reference" - The Intel® Telecom Subsystem Summary Tool (its_sysinfo) provides a simple way to collect information about systems built using Intel telecom products.

- Chapter 22, "KernelVer Reference" - TheKernelVer tool can be used to verify whether or not a processor has crashed.
- Chapter 23, "MercMon Reference" - MercMon provides counter information about DM3 board device drivers (Class Driver and Protocol Drivers).
- Chapter 24, "PDK Trace Reference" - The PDK Trace tool allows those who use a DM3 PDK protocol to log specific information related to the operation of the protocol.
- Chapter 25, "Phone Reference" - The Phone tool uses the TSC and ToneGen instances and requires a TSC component. The Phone tool can control a single DM3 resource channel (make calls, wait for calls etc.), monitor channel and call states, and send call control operations to a DM3 Global Call resource.
- Chapter 26, "PSTN Diagnostics Tool Reference" - The PSTN Diagnostics tool (pstndiag) is a utility for diagnosing and troubleshooting public switched telephone network (PSTN) connectivity problems on specific hardware products based on DM3 architecture.
- Chapter 27, "QScript Reference" - This chapter provides information about QScript utilities, which are a subset of the diagnostic utilities.
- Chapter 28, "Runtime Trace Facility (RTF) Reference" - The RTF tool provides a mechanism for tracing the execution path of various Intel Dialogic runtime libraries. The resulting log file/debug stream output helps troubleshoot runtime issues for applications that are built with Intel Dialogic software.
- Chapter 29, "RTFManager Reference" - RTFManager is a GUI for the Runtime Trace Facility (RTF) diagnostic tool. RTF Manager allows you to easily configure logging and tracing levels. Previously, users had to manually edit the RTF configuration file.
- Chapter 30, "Status Monitor Reference" - The Status Monitor tool enables you to track the state of the TSC as well as the state of the bits on a robbed bit or CAS line.

Related Information

Refer to the following documents and websites for more information:

- Administration Guide
- SNMP Administration Guide
- Configuration Guide(s)
- Release Guide
- Release Update
- *http://developer.intel.com/design/telecom/support/* (for technical support)
- *http://www.intel.com/design/network/products/telecom/index.htm* (for product information)

Diagnostics Overview 1

This chapter presents an overview of the diagnostic tools and the debugging/troubleshooting tasks that can be performed with them. The following topics are included:

- Diagnostics Management Console (DMC) 17
- Common Diagnostic Tasks 17
- Tool Classification by Problem Type. 19

1.1 Diagnostics Management Console (DMC)

The Diagnostics Management Console (DMC) provides a single portal from which you can launch all the diagnostic tools supplied with Intel® telecom software. The DMC also enables you to locate the log files produced by these tools and view them with the appropriate viewer.

The DMC allows you to launch the diagnostic tools remotely through the standard remote control methods provided with the operating system, such as SSH or Remote Desktop.

For more information about the DMC, refer to the following chapters:

- Chapter 3, "Using the Diagnostics Management Console (DMC)"
- Chapter 13, "Diagnostics Management Console (DMC) Reference"

1.2 Common Diagnostic Tasks

This section provides a list of diagnostic tasks that can be performed by using the various diagnostics tools. Another way to find the tool and procedure you need is to look at problem types. Refer to Section 1.3, "Tool Classification by Problem Type", on page 19.

Hardware and Firmware Diagnostics

The following tasks can be accomplished using the diagnostic tools:

Checking the hardware

You can use the Dm3post and KernelVer tools to troubleshoot the physical boards in your system. Refer to these sections of the manual. Refer to the following chapters:

- Chapter 4, "Checking DM3 Architecture Boards"
- Chapter 17, "DM3post Reference"
- Chapter 22, "KernelVer Reference"

Checking the firmware

You can use the DebugAngel, MercMon, and PDK Trace tools to diagnose and trace problems with a board's firmware. Refer to the following:

- Section 4.5, “Tracing Firmware”, on page 28
- Chapter 12, “DebugAngel Reference”
- Chapter 23, “MercMon Reference”
- Chapter 24, “PDK Trace Reference”

Diagnosing a Control Processor, Signal Processor or Shared RAM Fault on a Board

You can use the dlgsnapshot tool to capture a core dump when a Control Processor (CP), Signal Processor (SP), or Shared RAM (SRAM) fault is detected on a DM3 board. Refer to the following:

- Section 4.6, “Diagnosing a Control Processor or Signal Processor Fault on a Board”, on page 29
- Chapter 15, “Dlgsnapshot Reference”

Software and Application Diagnostics

The following tasks can be accomplished using the diagnostic tools:

Checking the network connections

You can use the PSTN Diagnostics, Digit Detector, and CallInfo tools to check your board’s network connections. Refer to the following:

- Chapter 5, “Diagnosing First Call Issues”
- Chapter 26, “PSTN Diagnostics Tool Reference”
- Chapter 10, “CallInfo Reference”

Checking the PSTN protocol configuration

You can use the PSTN Diagnostics tool to check your board’s protocol configuration. Refer to the following:

- Chapter 6, “Diagnosing PSTN Protocol Issues”
- Chapter 26, “PSTN Diagnostics Tool Reference”

Collecting CAS trace information

Inbound and outbound R2MF tones and CAS bit transitions/states can be traced using existing Global Call APIs and a Global Call event (GCEV_TRACEDATA). This allows developers to determine the root cause of protocol issues in a system that uses Intel NetStructure DMT160TEC digital telephony interface boards. Refer to Chapter 8, “Tracing CAS Signaling Using Global Call”.

Collecting system data to diagnose an application failure or crash

You can use the Intel Telecom Subsystem Summary Tool (its_sysinfo) to collect the system data you will need to send to Intel’s Support Services to troubleshoot an application failure or crash. Refer to the following:

- Section 7.2, “Collecting System Data to Diagnose an Application Failure or Crash”, on page 44
- Chapter 21, “Intel Telecom Subsystem Summary Tool Reference”

Collecting ISDN trace information

The ISDNtrace tool described in Chapter 20, “ISDN Trace Reference” allows you to perform tracing on only one trunk. The procedure described in Chapter 9, “Tracing Multiple ISDN Trunks Using Global Call” allows you to collect ISDN D-channel trace information on two or more trunks at the same time and the capture of the trace information can be dynamically

started and stopped via Global Call APIs. The trace information collected with this procedure allows developers to determine the root cause of protocol issues in a system that uses Intel NetStructure® DMT160TEC or DMN160TEC digital telephony interface boards.

Creating a system configuration archive

As part of a quality control effort, you might want to baseline your systems by retrieving all available information using the Intel Telecom Subsystem Summary Tool (its_sysinfo). Refer to the following:

- Section 7.3, "Creating a System Configuration Archive", on page 44
- Chapter 21, "Intel Telecom Subsystem Summary Tool Reference"

Tracing Intel Dialogic Runtime Libraries

You can use the Runtime Trace Facility (RTF) tool to trace the execution path of various Intel Dialogic runtime libraries. Refer to the following:

- Section 7.1, "Troubleshooting Runtime Issues", on page 41
- Chapter 28, "Runtime Trace Facility (RTF) Reference"
- Chapter 29, "RTFManager Reference"

1.3 Tool Classification by Problem Type

This section groups the diagnostic tools by problem type. The list that follows can help you locate the appropriate tool to use based on the problem you are having:

Board, Firmware, or Hardware Failures

To troubleshoot the physical boards in your system, use the following procedures and tools:

- Section 4.2, "Checking an Individual Board", on page 27
- Section 4.3, "Checking all the Boards in a System", on page 28
- Chapter 17, "DM3post Reference"
- Chapter 22, "KernelVer Reference"

To diagnose and trace problems with a board's firmware, use the following procedures and tools:

- Section 4.5, "Tracing Firmware", on page 28
- Chapter 12, "DebugAngel Reference"
- Chapter 23, "MercMon Reference"

To capture a core dump when a Control Processor (CP), Signal Processor (SP), or Shared RAM (SRAM) fault is detected on a DM3 board, refer to the following procedure and tool:

- Section 4.6, "Diagnosing a Control Processor or Signal Processor Fault on a Board", on page 29
- Chapter 15, "Dlgsnapshot Reference"

Debugging Software

You can use the Runtime Trace Facility (RTF) tool and Intel Telecom Subsystem Summary Tool (its_sysinfo) for some general software debugging. Refer to the following:

- Section 7.1, "Troubleshooting Runtime Issues", on page 41
- Section 7.2, "Collecting System Data to Diagnose an Application Failure or Crash", on page 44

- Section 7.3, “Creating a System Configuration Archive”, on page 44
- Chapter 28, “Runtime Trace Facility (RTF) Reference”
- Chapter 29, “RTFManager Reference”
- Chapter 21, “Intel Telecom Subsystem Summary Tool Reference”

Protocol Issues

Information about for collecting CAS and ISDN trace information is provided in the following sections:

- Chapter 8, “Tracing CAS Signaling Using Global Call”
- Chapter 9, “Tracing Multiple ISDN Trunks Using Global Call”
- Chapter 18, “GCEV_TRACEDATA Reference”

The trace information collected with these procedures allows developers to determine the root cause of protocol issues in a system that uses Intel NetStructure® DMT160TEC or DMN160TEC digital telephony interface boards.

PSTN Connectivity

You can use the PSTN Diagnostics, Digit Detector, and CallInfo tools to check your board’s network connections. Refer to the following:

- Chapter 5, “Diagnosing First Call Issues”
- Chapter 26, “PSTN Diagnostics Tool Reference”
- Chapter 10, “CallInfo Reference”

PSTN Protocol Debugging

You can use the PSTN Diagnostics tool to check your board’s protocol configuration. Refer to the following:

- Chapter 6, “Diagnosing PSTN Protocol Issues”
- Chapter 26, “PSTN Diagnostics Tool Reference”

System Requirements 2

This chapter provides information about the hardware/software requirements needed to run the diagnostic tools. Topics include:

- Hardware Requirements 21
- Software Requirements 21

2.1 Hardware Requirements

To use the diagnostic tools, your system must meet the following hardware requirements:

- Your system must meet the hardware requirements listed in the System Requirements chapter of the Release Guide for the Intel® Dialogic® system release you are using.
- Your system must have at least one Intel® telecom board supported by the Intel Dialogic system release you are using.

2.2 Software Requirements

To use the diagnostic tools, your system must meet the following software requirements:

- Your system must meet the software requirements listed in the System Requirements chapter of the Release Guide for the Intel® Dialogic® system release you are using.
- The Intel Dialogic System Release must be installed on your system.
- Java Runtime Environment (JRE) version 1.5 must be installed on your system.

Using the Diagnostics Management Console (DMC) 3

This chapter describes how to use the Diagnostics Management Console (DMC) to launch the diagnostic tools supplied with Intel® telecom software and view the log files produced by the tools. The following information is included:

- Launching a Diagnostic Tool 23
- Launching a Diagnostic Tool on a Remote Machine 24
- Viewing a Log File 24
- Specifying a Different Location for Log Files 24

For a description of the DMC and its windows and menus, refer to Chapter 13, "Diagnostics Management Console (DMC) Reference".

3.1 Starting the DMC

On Windows systems, you can start the DMC via the Start menu: **Start > [Intel telecom software release] > Diagnostics Management Console (DMC)**. The DMC application can be found in the *bin* directory of the installed Intel telecom software.

On Linux systems, you can start the DMC from anywhere since the *bin* directory is part of the path.

The DMC application (*DMC.jar*) is the same for both Windows and Linux. You use *DMC.bat* to launch the DMC on Windows and *dmc.sh* to launch the DMC on Linux.

3.2 Launching a Diagnostic Tool

Locate the tool you want in the list of local diagnostic applications (on the left side of the DMC main window), click on it to highlight it, and then press **Enter** *or* select **Execute application** from the **File** menu *or* press **F5**. You can also double-click on the tool name to launch it.

The DMC will execute the application via the command shell.

Related information:

- Section 3.3, "Launching a Diagnostic Tool on a Remote Machine", on page 24
- Section 3.4, "Viewing a Log File", on page 24
- Section 13.3.3, "Log File Panel", on page 73

3.3 Launching a Diagnostic Tool on a Remote Machine

To use a diagnostics tool on a remote machine, you must change settings on the DMC Configuration Dialog.

1. Access the DMC Configuration Dialog by selecting **Configuration** from the **Tools** menu *or* pressing **F4**.
2. Check the box next to **Remote Execution of CLI Tools**.
3. Enter the **Remote Machine Name**.
4. Enter the **Remote Login UserName**.
5. In the **Remote Tool Path** field, specify the path of the diagnostic tool that you will use remotely via a CLI. You can use the **Browse Path** button to specify the path.
6. Click **OK**.
7. Locate the tool you want in the list of remote diagnostic applications (on the left side of the DMC main window), click on it to highlight it, and then press **Enter** *or* select **Execute application** from the **File** menu *or* press **F5**. You can also double-click on the tool name to launch it.

Related information:

- Section 13.4, “DMC Configuration Dialog”, on page 74
- Section 3.2, “Launching a Diagnostic Tool”, on page 23 (local machine)
- Section 3.4, “Viewing a Log File”, on page 24
- Section 13.3.3, “Log File Panel”, on page 73

3.4 Viewing a Log File

To view a log file, locate the file you want in the log file list, click on it to highlight it, and then press **Enter** *or* select **Open log file** from the **File** menu *or* use the **CTRL+O** shortcut. You can also double-click on the log file name to view it. The viewer that is associated with a given log file and located on the local machine will be used to view the log file.

For more information about locating log files and the log file list, refer to Section 13.3.3, “Log File Panel”, on page 73.

3.5 Specifying a Different Location for Log Files

You can use the **Browse** button on the log file panel to locate log files. However, if you want to change the default location in which the DMC will look for log files, you can specify it on the DMC Configuration Dialog. You can access the DMC Configuration Dialog by selecting

Configuration from the **Tools** menu or pressing **F4**. A **Browse** button allows you to select a directory for the Log File Directory field.

Note: If the user-defined variable is empty or not valid, the DMC will use the environment variable set up during installation of the Intel telecom software: INTEL_DIALOGIC_DIR/log.

For more information about the DMC's list of log files, refer to Section 13.3.3, "Log File Panel", on page 73.

Checking DM3 Architecture Boards 4

This chapter provides procedures for checking the Intel NetStructure® on DM3 architecture hardware and firmware in your system.

- Preparations 27
- Checking an Individual Board 27
- Checking all the Boards in a System 28
- Unsupported Boards 28
- Tracing Firmware 28
- Diagnosing a Control Processor or Signal Processor Fault on a Board 29

4.1 Preparations

To find out which boards are in your system and which slots they are in, on Windows systems you can use the Configuration Manager (DCM) and on Linux systems you can run `./config.sh` to get the board configuration tool. In both cases, the main menu will provide information about the boards.

4.2 Checking an Individual Board

This section provides a procedure for using the DM3post tool to check an individual DM3 architecture board at any time to detect and isolate possible hardware faults. For more information on this tool, refer to Chapter 17, "DM3post Reference".

To use the DM3post tool to check a DM3 board, follow this procedure:

1. Make sure the board is in a "Stopped" state. This is necessary because DM3post will reset the specified board, forcing the Control Processor (CP) POST diagnostics to run.

   DM3post will then retrieve the POST results from the SRAM and provide a PASS/FAIL indication. The board will remain in a stopped state and you will be required to restart the board.

2. Run the DM3post command, specifying the slot and bus number of the board. For example, the following command runs the DM3post tool on a board in slot 17, bus 0:

   ```
   dm3post -s17 -b0
   ```

3. You will get the following response:

   ```
   Do you wish to continue (y/n)?
   ```

   If you answer Y, the following will be printed to the screen:

   ```
   dm3post processing...
   ```

The success/failure message will be printed to the screen when POST is complete.

4.3 Checking all the Boards in a System

The DM3post diagnostic utility provides an option to run POST on a chassis level. By using the chassis option (`-c`), DM3post will retrieve the results of the last run POST for all DM3 boards in the chassis. By using the chassis option (`-c`) with the reset (`-r`) option, you can run POST on all DM3 boards in the system.

When using the chassis option, it is not necessary to provide the bus and slot numbers. Any option other than the reset option will be ignored when using the chassis option.

In addition to output on the screen, more detailed output is logged to a log file, *dm3post.log*, by default.

4.4 Unsupported Boards

The Intel® Dialogic® System Release software will not prevent you from installing an unsupported board. However, the configuration manager will not show any unsupported boards. An error message about the unsupported board(s) will appear in a log file in the *log* directory with the following filename: *rtf*.txt* (for example, *rtflog-10072005-14h47m25.639s.txt*). The following is a sample error message:

```
10/04 14:55:50.784  1792  1820 OAMSYSLOG  ErrorEx   NCMAPI - Board bus-1,
slot-9, model-256, serialNumber-KU005523 is not supported in this release
```

4.5 Tracing Firmware

This section describes how to use the DebugAngel tool to perform low-level firmware tracing for low-level debugging. For more information about the DebugAngel tool, refer to Chapter 12, “DebugAngel Reference”.

DebugAngel polls the DM3 boards in the system and posts **qPrintf( )** statements from the resources and DM3 kernel to a log file.

To use DebugAngel, follow these steps:

1. Install the service and start it running in automatic mode by entering the following command:

   ```
   DebugAngel -install
   ```

2. When you need to refer to the firmware trace log, look in the *log* directory:
   - On a Windows system, information is logged to the file *DebugAngel.log* in the *%INTEL_DIALOGIC_DIR%\log* directory.
   - On a Linux system, information is logged to the file *debugangel.log* in the *${INTEL_DIALOGIC_DIR}/log* directory.

Command line options and configuration options for DebugAngel are provided in Chapter 12, "DebugAngel Reference".

4.6 Diagnosing a Control Processor or Signal Processor Fault on a Board

This section describes how the Dlgsnapshot tool is used to capture a core dump when a Control Processor (CP) or Signal Processor (SP) fault is detected on a DM3 board. For details about the Dlgsnapshot tool, refer to Chapter 15, "Dlgsnapshot Reference".

When a fault occurs, the board on which the fault occurred is stopped automatically without interrupting the system and a core dump file is created in the *log* directory. The naming convention for this file is described in Chapter 15, "Dlgsnapshot Reference".

Windows systems: When a core dump file is generated, you can send a *.zip* file containing the contents of the *%INTEL_DIALOGIC_DIR%\log* directory along with the Windows event viewer system log file (**.evt*) to Intel's telecom support resources for debugging purposes.

Linux systems: When a core dump file is generated, you can send a *.tar* file containing the contents of the *${INTEL_DIALOGIC_DIR}/log* directory to Intel's telecom support resources for debugging purposes.

You can also run the Dlgsnapshot on demand from the command line. You must specify the print buffer to be dumped. Other command line options include the AUID, processor number, logical ID, physical slot number, PCI bus number, and PCI slot number. A description of all the command line options is given in Chapter 15, "Dlgsnapshot Reference".

When boards are downloaded and you run Dlgsnapshot manually, a question is posed about running diagnostic firmware. You must confirm that you want Dlgsnapshot to stop the running board and download diagnostic firmware.

Diagnosing First Call Issues 5

This chapter describes how to use the PSTN Diagnostics tool (pstndiag) to determine what is preventing your system from successfully completing the first call.

- Preparation 31
- Monitoring the Signal 31
- Monitoring the Status of Alarms 33

For more information about the pstndiag tool, refer to Chapter 26, "PSTN Diagnostics Tool Reference".

5.1 Preparation

Before you perform the procedures described in this chapter, refer to the following sections:

- Section 26.2, "Guidelines", on page 128
- Section 26.3, "Preparing to Run the PSTN Diagnostics Tool", on page 128
- Section 26.4.1, "Starting the PSTN Diagnostics Tool", on page 128.

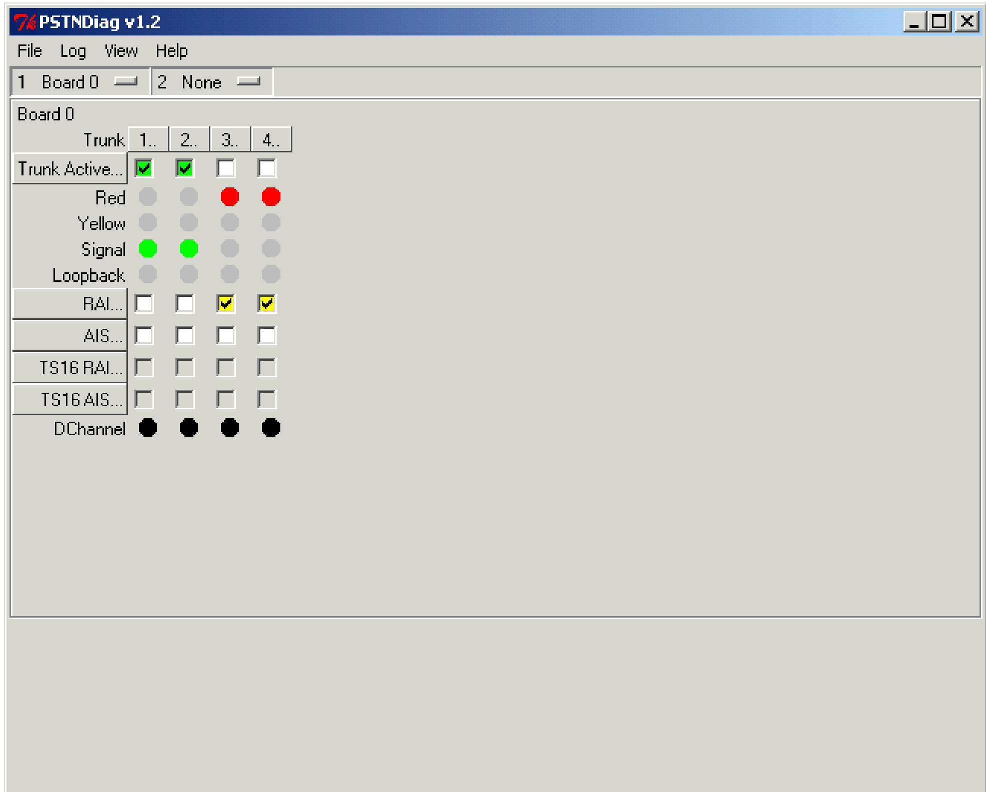
The main window displays a tree or hierarchy of the components in your system. Components include all boards that have been downloaded in the system, all trunks within a board, and all channels within a trunk.

5.2 Monitoring the Signal

Use the following procedure to verify that a connection exists between your board and the network (or other device depending on your system setup):

1. On the pstndiag tool's main window, double-click on a specific board to display the board level view and check the connection of all trunks on this board. A sample screen is illustrated in Figure 1.

Figure 1. PSTN Diagnostics Tool - Board Level View



2. In the board level view, check that the Signal indicator is green for each trunk. The color green indicates a connection between the trunk and another device. The color grey indicates no connection exists. (The various indicators for each trunk, Red, Yellow, Signal, and Loopback, mimic the indicators on the physical board.)

3. If the Signal indicator is green for all trunks on the board, then a connection exists between all trunks and another device. You can then proceed to check the status of alarms as described in Section 5.3, "Monitoring the Status of Alarms", on page 33.

   If the Signal indicator is grey for a trunk, no connection exists. The cause may be a hardware problem or a faulty connection.

   Note: The Loopback indicator shows whether your board is set for loopback test mode. If loopback is in place, the Loopback indicator is orange; otherwise, the indicator is grey. You should not have your board in loopback test mode for normal operation of the pstndiag tool.

4. Repeat steps 1 through 3 for all boards in your system.

5.3 Monitoring the Status of Alarms

After determining that the Signal indicator for all boards in your system is green as described in Section 5.2, "Monitoring the Signal", on page 31, check the status of alarms on each trunk.

On the pstndiag tool's main window, double-click on a specific board to display the board level view and check the status of the following alarms on each trunk (see Figure 1, "PSTN Diagnostics Tool - Board Level View", on page 32 for an illustration):

Red
: Red alarm. A red alarm is generated by the line (trunk) of the board being monitored to report a loss of synchronization (RLOS) in the signal being received. This alarm is declared after the condition has existed for a specific time period, typically defined as 2.5 seconds (default). The red alarm condition will exist until the synchronization has been recovered and remains recovered for 12 seconds (default).

Yellow
: Yellow alarm. A yellow alarm is generated by the line (trunk) of the board being monitored to signify that a red alarm condition exists at the receiving (local) end. The yellow alarm is sent as long as the red alarm condition exists at the receiver device.

Note: It's possible for the Signal indicator to be green and a yellow or red alarm to be on at the same time. This situation indicates a possible configuration problem (such as trunk configuration mismatch) or hardware problem.

RAI
: Remote Alarm Indication. If on, this box is yellow. This alarm is turned on by the firmware indicating a problem on the remote end. In this situation, the Signal indicator for the trunk will also be red.

AIS
: Alarm Indication Service. This alarm can be turned on by you as a test on a specific trunk. This alarm is not typically used.

TS16RAI
: TS16 Remote Alarm Indication. This alarm only applies to E1 lines with Channel Associated Signaling (CAS).

TS16AIS
: TS16 Alarm Indication Service. This alarm only applies to E1 lines with Channel Associated Signaling (CAS).

D Channel
: D channel state. This alarm only applies to ISDN with Common Channel Signaling (CCS). If the indicator is green, this means that the D channel is available. If the indicator is grey, this means that the channel is not available.

Diagnosing PSTN Protocol Issues 6

This chapter describes how to check the protocol configuration using the PSTN Diagnostics (pstndiag) tool.

- Preparation 35
- Checking the Protocol Configuration 35

For more information about the pstndiag tool, refer to Chapter 26, "PSTN Diagnostics Tool Reference".

6.1 Preparation

Before you use the pstndiag tool as described in this chapter, refer to the following sections:

- Section 26.2, "Guidelines", on page 128
- Section 26.3, "Preparing to Run the PSTN Diagnostics Tool", on page 128

After determining that a network connection exists as described in Chapter 5, "Diagnosing First Call Issues", check the protocol configuration. If the protocol is not properly configured, calls will not be successfully made. To check the protocol configuration, you will make and receive calls on your system. Protocols are configured on a trunk basis.

The procedure described in this section applies to a system with a loopback test setup or a system using a network connection setup.

If you can successfully make and receive calls in a system with loopback test setup, you can rule out any hardware problems. If you then test your system using a network connection setup, and are unsuccessful in making and receiving calls, you will need to check the board configuration settings. The configuration settings on the board and the switch should match; for example, the line type, the line coding, and the signaling protocol.

6.2 Checking the Protocol Configuration

Use the following procedure to check the protocol configuration:

1. If you have not already done so, start the pstndiag tool, as described in Section 26.4.1, "Starting the PSTN Diagnostics Tool", on page 128.

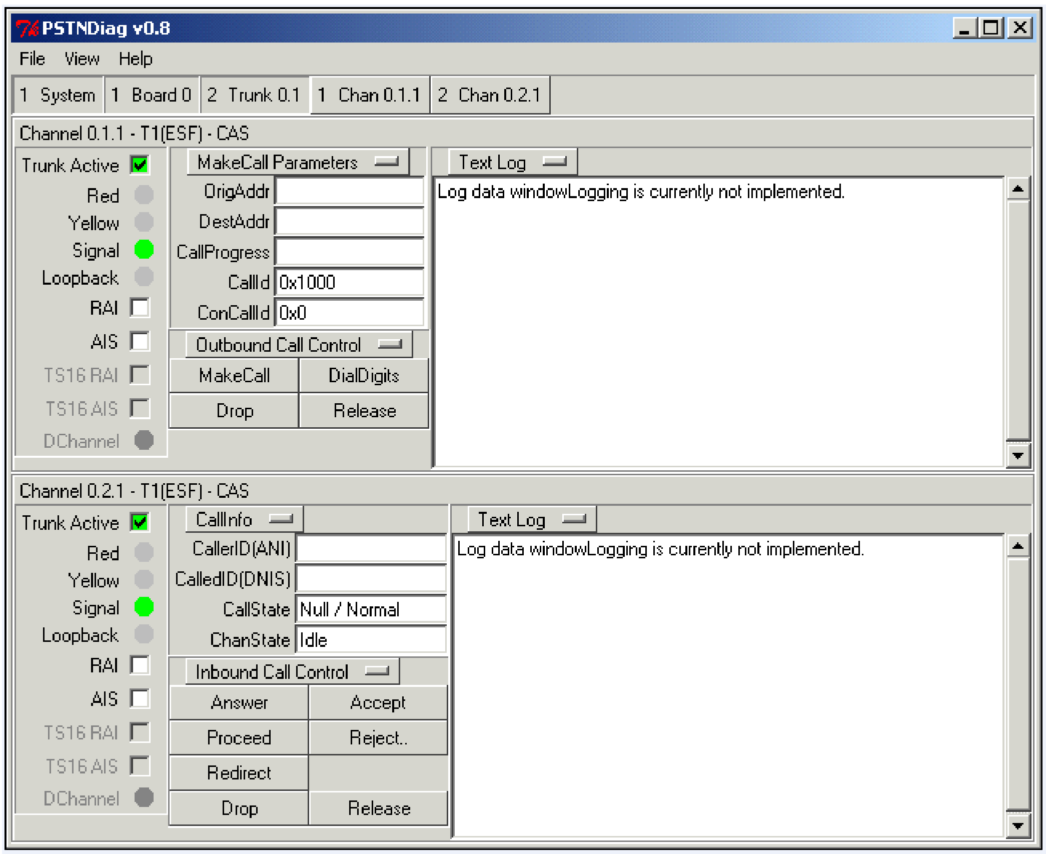
   The main window displays a tree or hierarchy of the components in your system, including all boards that have been downloaded in the system, all trunks within a board, and all channels within a trunk.

2. Shift-double-click on a channel (for example, Chan 0.1.1) to display the channel in the lower pane. This channel will be the transmitting (outbound) channel.

3. Shift-double-click on a channel in another trunk (for example, Chan 0.2.1) to display the channel in the lower pane. This channel will be the receiving (inbound) channel.

4. To view both inbound and outbound channels on your screen, click on the "**1 System**" button (upper pane button) and select "**Chan 0.1.1**" (outbound channel). This channel level view replaces the system level view and is displayed in the upper pane. The inbound channel is displayed in the lower pane.

Figure 2. PSTN Diagnostics Tool - Outbound Channel (Upper Pane) & Inbound Channel (Lower Pane)



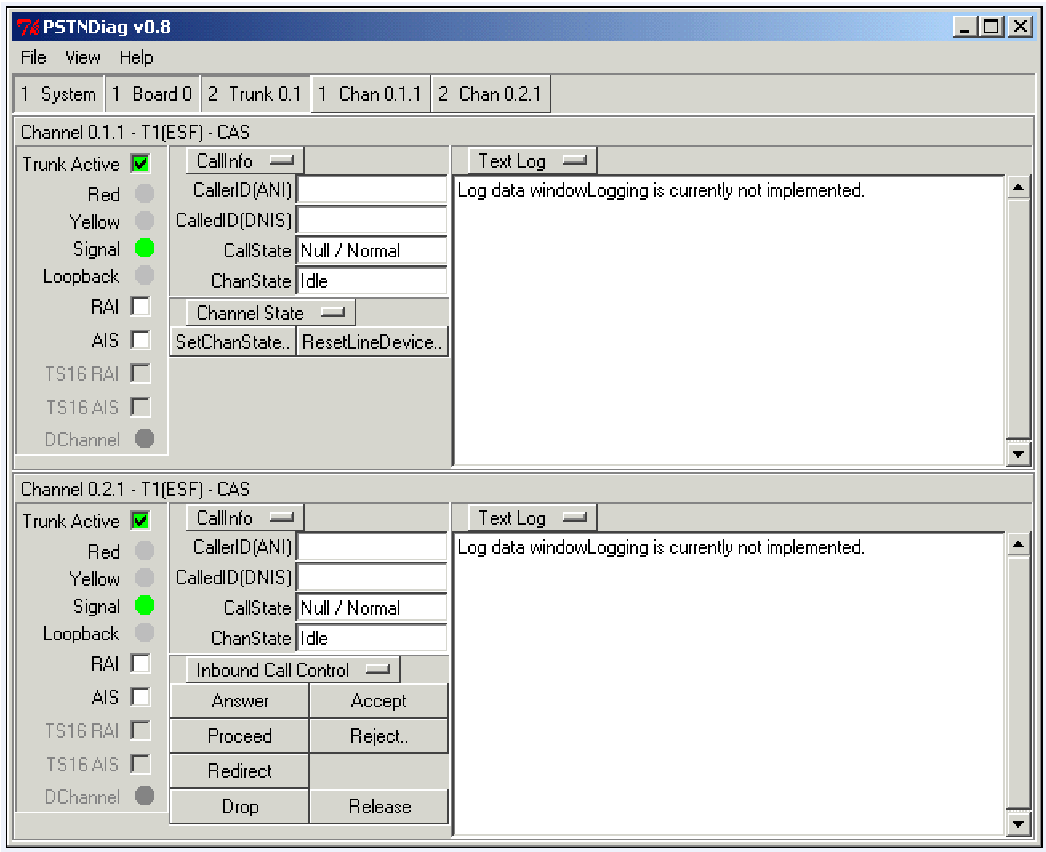
5. For the outbound channel (upper pane), click the **CallInfo** button to view additional options, and select the **Edit MakeCall Parameters** option. A new set of fields is displayed.

6. Enter the originating telephone number or extension in the OrigAddr field.

7. Enter the destination telephone number or extension in the DestAddr field.

Note: The Call Progress, CallId, and ConCallId fields are not typically used and should not be modified. The Call Progress field specifies the level of call progress analysis on the line. The CallId and ConCallId fields contain internal values used by the firmware to keep track of call information.

Figure 3. PSTN Diagnostics Tool - Making a Call



8. For the outbound channel (upper pane), click the **MakeCall Parameters** button to view options, and select the CallInfo button.

9. For the outbound channel (upper pane), click the **SetChanState** button and set the channel in service.

10. For the inbound channel (lower pane), click the **SetChanState** button and set the channel in service.

11. For the outbound channel (upper pane), click the **Channel State** button to view additional options, and select Outbound Call Control Commands.

12. For the inbound channel (lower pane), click the **Channel State** button to view additional options, and select Inbound Call Control Commands.

13. Click the **MakeCall button** to start the call. Notice that the CallInfo fields are updated after a call is made, enabling you to monitor the state of the call. For example, the Called ID (DNIS) field shows the telephone number dialed by a caller. The Caller ID (ANI) field shows the telephone number of the incoming call. Also the CallState field shows the state of the call (such as Connected or not) and the ChanState field shows the state of the channel (such as Active or not).

14. For the inbound channel (lower pane), click the **Accept** button to accept the incoming call. Notice that the CallState for the inbound channel will show “Accepted.” If the expected state is not being displayed, it may indicate a protocol configuration problem.

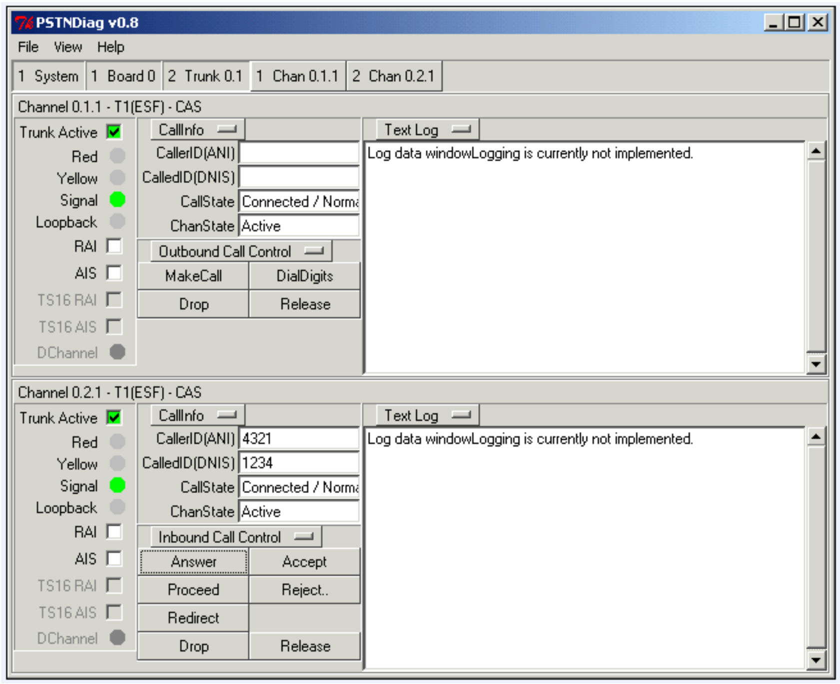
15. For the inbound channel (lower pane), click the **Answer** button to answer the incoming call. Notice that the CallState for the inbound channel now shows “Connected.” If the expected state is not being displayed, it may indicate a protocol configuration problem.

16. After you have verified that a call is successfully made, click the **Release** button for the outbound channel to end the call. The CallState for the inbound channel will show “Disconnected”. The CallState for the outbound channel will not change yet.

17. Click the **Release** button for the inbound channel to end the call. The CallState for the outbound and inbound channels will show “Null / Normal”. The ChanState for the outbound and inbound channels will show “Idle”. If the expected state is not being displayed, it may indicate a protocol configuration problem.

    Note: In a channel level view, a log pane is displayed below the **Text Log** button. This log pane only displays events for that particular channel. To change the view between text format and graphical format, click the **Text Log** button.

Figure 4. PSTN DIagnostics Tool - Call Completed and Released



Debugging Software 7

This chapter provides several procedures that can be useful for general software debugging:

- Troubleshooting Runtime Issues 41
- Collecting System Data to Diagnose an Application Failure or Crash 44
- Creating a System Configuration Archive. 44

7.1 Troubleshooting Runtime Issues

This section describes how to use the Runtime Trace Facility (RTF) for tracing the execution path of various runtime libraries. You can use the RTFManager GUI to customize the trace settings or you can manually edit the RTF configuration file. Procedures for each of these approaches are provided in the following sections:

- Using RTFManager to Customize Trace Settings
- Manually Editing the RTF Configuration File

Using RTFManager to Customize Trace Settings

You can use the RTFManager GUI to customize and activate the RTF's tracing capabilities as follows:

1. Start RTFManager:
   - On Windows systems, RTFManager can be started from the Start menu. RTFManager is in the program group for the Intel telecom software. RTFManager can also be started by just typing "RTFManager" from the console.
   - On Linux systems, RTFManager can be started by typing `/usr/dialogic/RTFManager` or `RTFManager` if the executable is in the operating system's executable searching path.

   RTFManager's main window appears.

2. From the **Tools** menu, select **RTF Configuration...** This launches the Runtime Trace Facility Manager Configuration window. The Runtime Trace Facility Manager Configuration window contains the following two tabs:
   - General - The General tab is used to enable/disable RTF tracing and customize the format, readability and location of the log files. Refer to Section 29.5, "General Tab", on page 166 for more information.
   - Filtering - The Filtering tab allows you to determine which libraries to trace and the trace level (Debugging, Program Flow, Warnings, Errors) for each library. Refer to Section 29.6, "Filtering Tab", on page 168 for information about using the Filtering tab.

   Adjust the settings on each of these tabs to suit your needs and click **OK** when you are finished.

3. Start your application. As your application runs, RTF will trace the runtime libraries according to RTF configuration file settings that you created using the RTFManager GUI. Refer to the individual entries in the log file or debug stream to review the trace statements generated by the runtime libraries.

4. If you wish to dynamically edit the RTF trace levels while your application runs, it is not necessary to stop the RTF. Instead, perform the following:
   1. Start RTFManager.
   2. Customize the RTF settings using RTFManager (as described above).
   3. Issue the `rtftool reload` command to reload RTF configuration file and restart the RTF engine.

   Note: Keep in mind that changes made to the RTF configuration file will not be reflected in the RTF output until the tool has been reloaded.

5. At any time, you can issue the `rtftool` command to pause/restart RTF. RTF will not provide trace output while it is paused.

For more information about RTFManager, refer to Chapter 29, "RTFManager Reference". This chapter also tells you how to use RTFManager to customize the log file so that only certain trace statements are displayed (refer to Section 29.7, "Log File Filtering", on page 170).

Manually Editing the RTF Configuration File

Note: If you run full RTF logging on high-density systems (1000 media channels), you may experience I/O throughput degradation. It is recommended that you do not run RTF with full logging on high-density systems or any field-deployed systems. Instead, use runtime filtering capabilities of the RTF to only log the data you are interested in.

Use the following procedure to manually customize and activate the RTF's tracing capabilities:

1. Locate the RTF configuration file. The default installation location is determined by the INTEL_DIALOGIC_CFG environment variable.

   Note: The INTEL_DIALOGIC_CFG environment variable is set when the Intel® Dialogic® system software is installed. Refer to the *Intel Dialogic System Release Software Installation Guide* for information about Intel Dialogic system software environment variables. To determine the variable setting on a Linux system, type `echo $INTEL_DIALOGIC_CFG`. To determine the variable setting on a Windows system, type `set INTEL_DIALOGIC_CFG`.

2. If you are familiar with XML syntax, use any ASCII text editor to open the RTF configuration file (*RtfConfigWin.xml* for Windows and *RtfConfigLinux.xml* for Linux). If you are not familiar with XML syntax, open the RTF configuration file with XML editor software.

3. Edit the RTF configuration file to customize the RTF tracing capabilities. Refer to Section 28.3, "RTF Configuration File", on page 142 for complete information about editing the RTF configuration file. The RTF configuration file includes the following XML tags:
   - **RTFConfig:** This tag's attributes configure the RTF. All other tags in the RTF configuration file are children of this tag. This tag must appear one time in the RTF

configuration file. The RTF tracing capabilities are turned on by default. Refer to Section 28.3.1, "RTFConfig Tag", on page 143 for complete information about the RTFConfig tag. The RTFConfig tag includes the following child tags:

- **Logfile:** This is the first child tag of the RTFConfig tag. The Logfile tag's attributes set the parameters for the RTF logfile output. This tag is an optional part of the RTF configuration file. Refer to Section 28.3.2, "Logfile Tag", on page 145 for complete information about the Logfile tag.
- **Global:** This is the second child tag of the RTFConfig tag. The Global tag is used to specify the global configuration. Configuration settings at the global level are valid for all modules in the RTF configuration file. When a module is traced at the global level, all activity related to that particular module is traced. However, global tag settings have the lowest priority; they can be override by settings in individual Module tags. Refer to Section 28.3.3, "Global Tag", on page 147 for complete information about the Global tag.
- **Module**: This is the third child tag of the RTFConfig tag. The Module tag is used to specify the trace configuration for a particular module. The default RTF configuration contains pre-defined module tags for traceable runtime libraries. You can edit the **state** attributes of these pre-defined module tags or delete these pre-defined module tags. The default setting for each module's **state** attribute is 1, meaning that tracing is enabled by default for each module in the *.xml* file. If you choose to delete modules, keep in mind that the *RtfConfigLinux.xml* and *RtfConfigWin.xml* files must contain at least one Module tag. Refer to Section 28.3.7, "Module Tag", on page 150 for complete information about the Module tag.

4. When you are finished editing the RTF configuration file, save and close the file.

5. Start your application. As your application runs, RTF will trace the runtime libraries according to RTF configuration file settings. Refer to the individual entries in the log file or debug stream to review the trace statements generated by the runtime libraries.

6. If you wish to dynamically edit the RTF trace levels while your application runs, it is not necessary to stop the RTF. Instead, perform the following:
   1. Open the RTF configuration file.
   2. Customize the settings in the RTF configuration file.
   3. Save and close the RTF configuration file.
   4. Issue the `rtftool reload` command to reload RTF configuration file and restart the RTF engine.

   Note: Keep in mind that changes made to the RTF configuration file will not be reflected in the RTF output until the tool has been reloaded.

7. At any time, you can issue the `rtftool` command to pause/restart RTF. RTF will not provide trace output while it is paused.

- For more information about RTF and manually editing the configuration file, refer to Chapter 28, "Runtime Trace Facility (RTF) Reference".

Note: If you run full RTF logging on high-density systems (1000 media channels), you may experience I/O throughput degradation. It is recommended that you do not run RTF with full logging on high-density systems or any field-deployed systems. Instead, use runtime filtering capabilities of the RTF to only log the data you are interested in.

7.2 Collecting System Data to Diagnose an Application Failure or Crash

This section describes how to use the Intel® Telecom Subsystem Summary Tool (its_sysinfo) to collect the system data you will need to send to Intel's Support Services to troubleshoot an application failure or crash.

Here are two sample scenarios in which you might use the its_sysinfo tool to gather system data:

- A telephony application you are running exits or gets terminated unexpectedly. At that point, you would launch the Intel Telecom Subsystem Summary Tool (its_sysinfo) to collect the log files and environment information to send to Intel's Support Services using your credentials.
- Your telephony application doesn't work as expected. For example, an attempt to make a call fails. At that point, you would run the Intel Telecom Subsystem Summary Tool to gather the log files and environment information to send to Intel's Support Services.

To familiarize yourself with the Intel Telecom Subsystem Summary Tool (its_sysinfo) and all the data it collects, refer to Chapter 21, "Intel Telecom Subsystem Summary Tool Reference".

Follow this procedure to use its_sysinfo to collect system data to pass along for troubleshooting:

1. Start the tool.
   - Linux systems – On the command line, enter `its_sysinfo filename` where *filename* is the name you want to give the zip file. The its_sysinfo tool will collect system information and compress it into the zip file. If you do not specify any filename, then the information gets compressed in a zip file with the default name *its_sysinfo.zip*.
   - Windows systems:
     1. Click on *its_sysinfo.exe* in `%INTEL_DIALOGIC_DIR%\bin`.
     2. Click the **Generate** button. A dialog box appears on which you must name the archive file into which you want the information to be collected. The default filename is *its_sysinfo.zip*.
     3. Click the **Save** button and its_sysinfo will start collecting information.
     4. A pop-up window displaying "Data collection completed. Zip archive was created as <zip file name>" will appear to indicate completion of *its_sysinfo.exe* execution. Click the **OK** button. The archive file is in the location specified in the tool.
2. Use any standard compression/decompression tool (such as WinZip*) to extract and review the data or send the zip file to Intel's Support Services.

7.3 Creating a System Configuration Archive

This section describes how to use the Intel® Telecom Subsystem Summary Tool (its_sysinfo) to create a system configuration archive.

As part of a quality control effort, you might want to baseline your systems by retrieving all available information through its_sysinfo. You would archive this baseline system information and

use it as a point of comparison to any system that exhibits erroneous behavior. This would provide you with a means of performing an initial cause/effect analysis when you troubleshoot the problem.

To familiarize yourself with the Intel Telecom Subsystem Summary Tool (its_sysinfo) and all the data it collects, refer to Chapter 21, "Intel Telecom Subsystem Summary Tool Reference".

Follow this procedure to use its_sysinfo to create a system configuration archive:

1. Start the tool.
   - Linux systems – On the command line, enter `its_sysinfo filename` where *filename* is the name you want to give the zip file. The its_sysinfo tool will collect system information and compress it into the zip file. If you do not specify any filename, then the information gets compressed in a zip file with the default name *its_sysinfo.zip*.
   - Windows systems:
     1. Click on *its_sysinfo.exe* in `%INTEL_DIALOGIC_DIR%\bin`.
     2. Click the **Generate** button. A dialog box appears on which you must name the archive file into which you want the information to be collected. The default filename is *its_sysinfo.zip*.
     3. Click the **Save** button and its_sysinfo will start collecting information.
     4. A pop-up window displaying "Data collection completed. Zip archive was created as <zip file name>" will appear to indicate completion of *its_sysinfo.exe* execution. Click the **OK** button. The archive file is in the location specified in the tool.
2. Retain the archive file as your baseline system information.

Tracing CAS Signaling Using Global Call 8

This chapter describes how to trace CAS signaling in systems with Intel NetStructure® DMT160TEC digital telephony interface boards using Global Call APIs and a Global Call event. The following information is provided:

- Introduction 47
- Requirements and Restrictions 48
- Enabling Tracing Using gc_StartTrace( ) 48
- Disabling Tracing Using gc_StopTrace( ) 49
- Reporting Trace Data via GCEV_TRACEDATA 50
- Setting the Trace Queue Size Using gc_SetConfigData( ) 52

8.1 Introduction

Inbound and outbound R2MF tones and CAS bit transitions/states can be traced using existing Global Call APIs and a Global Call event (GCEV_TRACEDATA). This allows developers to determine the root cause of protocol issues in a system that uses Intel NetStructure DMT160TEC digital telephony interface boards.

This capability provides a single interface through which every component on a DMT160TEC board can send trace data to the host in a generic format. The application that runs on the host and requires the trace data can start and stop the trace as needed using Global Call APIs. Trace data are presented to the application via a Global Call event and the application is responsible for the retrieval, processing, and logging of the traced data from the event.

Notes: ***1.*** For more information about Global Call APIs, refer to the *Global Call API for Linux and Windows Operating Systems Library Reference*.

2. Chapter 18, "GCEV_TRACEDATA Reference" describes the data layout in the GCEV_TRACEDATA so that a parser can be designed for viewing the data. A sample parser and sample parser output is also included.

Some use cases for performing this procedure are as follows:

- **Troubleshoot protocol problems that occur after provisioning a span for a new carrier**: After some time of handling traffic, an unused span is provisioned for a new carrier for Least Cost Routing (LCR). After the span is turned up, protocol problems occur. The protocol for the inbound and outbound spans must be traced to capture the error condition and determine a fix. Tracing can occur on two spans on the same board or on different boards. To gain a complete understanding of the entire call path, the call on the inbound span needs to be traced as well as the call on the outbound span.

- **Trace newly deployed spans to make sure there are no protocol issues:** A new platform consisting of 32 E1s is deployed. All spans are turned up at about the same time. All active spans are traced for up to the first minute of operation to determine if there are any protocol issues.

8.2 Requirements and Restrictions

Following are the prerequisites for performing this procedure:

- Intel® Dialogic® System Release
- At least one Intel NetStructure DMT160TEC digital telephony interface board
- The following registry setting modification is required to support this feature's functionality:

  HKEY_LOCAL_MACHINE\SOFTWARE\Dialogic\Cheetah\MaxMMBReplySize

  The value should be changed from 0x200 (512 decimal) to 0x400 (1024 decimal).

  If you use this feature without modifying the registry key, you will get the following failure event notifications: GCEV_TASKFAIL.
- The application is responsible for starting and stopping the tracing. This is done using Global Call APIs.
- Traced data will be presented to the application via an event (GCEV_TRACEDATA).
- The application will be responsible for retrieving, processing, and logging the traced data returned as a result of the traced data event.
- System performance dictates the maximum spans that can be traced. This will be determined empirically.

8.3 Enabling Tracing Using gc_StartTrace( )

The **gc_StartTrace( )** function starts the logging of debug information for a specific line device.

To use this feature, the line device must be the handle for a trunk or virtual board and the tracefilename pointer should be set to NULL. After **gc_StartTrace( )** returns success, instead of logging to a file, the application will be notified of the availability of trace data via GCEV_TRACEDATA. The trace will continue until a **gc_StopTrace( )** function is called.

Sample application code

Note: The following sample code was written for an application running on a system in which an Intel NetStructure DMT160TEC board was used as the network interface, an Intel NetStructure DMV2400A board was used as a play/record resource board, and the boards were connected via a CT Bus.

```
#include <stdio.h>
#include <srllib.h>
#include <gclib.h>
#include <gcerr.h>
```

```
LINEDEV bdev;           /* board level device number */
int rc;                 /* Return code */
int value;              /* value to be for specified parameter */
GC_INFO gc_error_info; /* GlobalCall error information data */
char devname[30];       /* Board/Trunk device name */

main()
{
        /* Open a trunk device */
        sprintf(dename, ":N_dtiB1:P_pdk_ar_r2_io");
        if(gc_OpenEx(&bdev, devname, EV_SYNC, &ldev) != GC_SUCCESS)
        {
                /* Process the error as decided earlier */
                gc_ErrorInfo( &gc_error_info );
                printf ("Error: gc_OpenEx() on devname: %s, GC ErrorValue: 0x%hx - %s,
                       CCLibID: %i - %s, CC ErrorValue: 0x%lx - %s\n",
                       devname, gc_error_info.gcValue, gc_error_info.gcMsg,
                       gc_error_info.ccLibId, gc_error_info.ccLibName,
                       gc_error_info.ccValue, gc_error_info.ccMsg);
                return (gc_error_info.gcValue);
         }

         rc = gc_StartTrace(bdev, NULL);
         if (rc != GC_SUCCESS)
         {
                 /* Process the error */
                 gc_ErrorInfo( &gc_error_info );
                 printf ("Error: gc_StartTrace() on devname: %s, GC ErrorValue: 0x%hx - %s,
                        CCLibID: %i - %s, CC ErrorValue: 0x%lx - %s\n",
                        devname, gc_error_info.gcValue, gc_error_info.gcMsg,
                        gc_error_info.ccLibId, gc_error_info.ccLibName,
                        gc_error_info.ccValue, gc_error_info.ccMsg);
                 return (gc_error_info.gcValue);
          }
          else
          {
                 /* continue */
          }
}
```

8.4 Disabling Tracing Using gc_StopTrace( )

The **gc_StopTrace( )** function stops the logging of debug information for a specific line device that was started using **gc_StartTrace( )**.

To use this feature, the line device must be the handle for a trunk or virtual board. After the **gc_StopTrace( )** function returns success, the application may be notified of the availability of the last remaining trace data via GCEV_TRACEDATA.

Sample application code

Note: The following sample code was written for an application running on a system in which an Intel NetStructure DMT160TEC board was used as the network interface, an Intel NetStructure DMV2400A board was used as a play/record resource board, and the boards were connected via a CT Bus.

```
#include <stdio.h>
#include <srllib.h>
#include <gclib.h>
#include <gcerr.h>

LINEDEV bdev;            /* board level device number */
int rc;                  /* Return code */
int value;               /* value to be for specified parameter */
GC_INFO gc_error_info;   /* GlobalCall error information data */
char devname[30];        /* Board/Trunk device name */

main()
{
        /* Open a trunk device */
        /* Start Tracing */
        .
        .
        /* Call Control activity, tracing captured */
        .
        .
        .
        /* Stop Tracing */
        rc = gc_StopTrace(bdev);
        if(rc != GC_SUCCESS) {
               /* Process the error */
               gc_ErrorInfo( &gc_error_info );
               printf ("Error: gc_StopTrace() on devname: %s, GC ErrorValue: 0x%hx - %s,
                      CCLibID: %i - %s, CC ErrorValue: 0x%lx - %s\n",
                      devname, gc_error_info.gcValue, gc_error_info.gcMsg,
                      gc_error_info.ccLibId, gc_error_info.ccLibName,
                      gc_error_info.ccValue, gc_error_info.ccMsg);
               return (gc_error_info.gcValue);
        } else {
               /* Continue */
        }
}
```

8.5 Reporting Trace Data via GCEV_TRACEDATA

The GCEV_TRACEDATA event is an unsolicited event used to notify the user application of the availability of tracing data. The user application should call **gc_StartTrace( )** successfully to enable receiving tracing data. The trace data is associated with the GCEV_TRACEDATA event via the GC_TRACEDATA data structure, which includes sequence number, data size, and data buffer. This data structure can be obtained by casting extevtdatap of METAEVENT. A proper result value is also associated with GCEV_TRACEDATA, which can be obtained via the **gc_ResultInfo( )** function.

The data structure GC_TRACEDATA associated with the GCEV_TRACEDATA event is defined in gclib.h:

```
#define GCVAL_TRACEDATA_SIZE2048 /* Maximum data size of tracing data */

typedef struct {
    unsigned long       seq_no;                    /* the sequence number  of tracing data*/
    unsigned short     data_size;                  /* the size of tracing data */
    char          data_buf[GCVAL_TRACEDATA_SIZE];  /* memory buffer for tracing data */
} GC_TRACEDATA, * GC_TRACEDTAP;
```

A new result value GCRV_QUEUE_OVERFLOW associated with GCEV_TRACEDATA event is defined in gcerr.h:

```
#define GCRV_QUEUE_OVERFLOW (GCRV_RESULT | 0x65) /* Queue overflow occurred - data overwritten
*/
```

Sample application code

Note: The following sample code was written for an application running on a system in which an Intel NetStructure DMT160TEC board was used as the network interface, an Intel NetStructure DMV2400A board was used as a play/record resource board, and the boards were connected via a CT Bus.

```
/*
* Do SRL event processing
*/
int    evttype;
char   tracedata[2048];
hdlcnt = 0;
hdls[ hdlcnt++ ] = GetGlobalCallHandle();
hdls[ hdlcnt++ ] = GetVoiceHandle();

/* Wait selectively for devices that belong to this thread */
rc = sr_waitevtEx( hdls, hdlcnt, PollTimeout_ms, &evtHdl);

if (rc != SR_TMOUT)
{
       /*
       * Update
       */
       rc = gc_GetMetaEventEx(&g_Metaevent, evtHdl);
       if (rc != GC_SUCCESS)
       {
              /* process error return */
              gc_ErrorInfo( &gc_error_info );
              printf ("Error: gc_GetMetaEventEx() on linedev: 0x%lx,
                     GC ErrorValue: 0x%hx - %s, CCLibID: %i - %s, CC ErrorValue: 0x%lx - %s\n",
                     metaevent.evtdev, gc_error_info.gcValue, gc_error_info.gcMsg,
                     gc_error_info.ccLibId, gc_error_info.ccLibName,
                     gc_error_info.ccValue, gc_error_info.ccMsg);
              return (gc_error_info.gcValue);
        }
        evttype = metaevent.evttype;
        rc = vProcessCallEvents( );
        switch (evttype)
        {
               case GCEV_TRACEDATA:
               {
                      memcpy((tracedata, metaevent.extevtdatap, sizeof(GC_TRACEDATA) );
                      /* decode the trace data */
                      break;
               }
               .
               .
               .
        }
}
```

8.6 Setting the Trace Queue Size Using gc_SetConfigData( )

The **gc_SetConfigData( )** API is used for setting the size of the trace buffer in the host DM3 call control library if overruns (overflow) occur. If the trace data queue in the host DM3 cclib overflows, the data at the front of the queue will get overwritten and the cause value associated with that data will be set to GCRV_QUEUE_OVERFLOW.

Notes: *1.* **gc_GetConfigData( )** can be used to retrieve the trace queue size.

2. Previously, the **gc_GetConfigData( )** and **gc_SetConfigData( )** APIs were not supported on DM3 architecture boards.

To set the trace queue size, the **gc_util_insert_parm_val( )** function must be used to populate the GC_PARM_BLK with the following parameter values:

- setID = CCSET_TRACEDATA
- parmID = CCPARM_TRACEQ_SIZE
- data_size = sizeof(int)
- data = integer value

Once the GC_PARM_BLK has been populated with the desired values, the **gc_SetConfigData( )** function can be issued to perform the configuration. The parameter values for the **gc_SetConfigData( )** function are as follows:

- target_type = GCTGT_CCLIB_NETIF
- target_id = the trunk line device handle
- target_datap = GC_PARM_BLKP parameter pointer, as constructed by the utility function **gc_util_insert_parm_val( )**
- time_out = time interval (in seconds) during which the target object must be updated with the data. If the interval is exceeded, the update request is ignored. This parameter is supported in synchronous mode only, and it is ignored when set to 0.
- update_cond = GCUPDATE_IMMEDIATE
- request_idp = pointer to the location for storing the request ID
- mode = EV_ASYNC for asynchronous execution or EV_SYNC for synchronous execution

Sample application code

Note: The following sample code was written for an application running on a system in which an Intel NetStructure DMT160TEC board was used as the network interface, an Intel NetStructure DMV2400A board was used as a play/record resource board, and the boards were connected via a CT Bus.

```
GC_PARM_BLKP ParmBlkp = NULL;
long id;

gc_util_insert_parm_val(&ParmBlk, CCSET_TRACEDATA, CCPRM_TRACEQ, sizeof(int), 500);
```

Note: The maximum value is 1000 and default is 32.

```
gc_SetConfigData(GCTGT_CCLIB_NETIF, bdev, ParmBlkp, 0, GCUPDATE_IMMEDIATE, &id, EV_ASYNC);
gc_util_delete_parm_blk(ParmBlkp);

if (sr_waitevt(-1) >= 0)
{
       METAEVENT meta;
       gc_GetMetaEvent(&meta);
       switch(sr_getevttype())
       {
               case GCEV_SETCONFIGDATA:
                       printf("Received event GCEV_SETCONFIGDATA(ReqID=%d) on device %s
                       \n",((GC_RTCM_EVTDATA *)(meta.evtdatap))->request_ID,
                       ATDV_NAMEP(sr_getevtdev()));
                       break;
               case GCEV_SETCONFIGDATA_FAIL
                       printf("Received event GCEV_SETCONFIGDATAFAIL(ReqID=%d) on device
                       %s, Error=%s\n",((GC_RTCM_EVTDATA *)(meta.evtdatap))->request_ID,
                       ATDV_NAMEP(sr_getevtdev()),
                       ((GC_RTCM_EVTDATA *)(meta.evtdatap))->additional_msg);
                       break;
               default:
                       printf("Received event 0x%x on device %s\n", sr_getevttype(),
                       ATDV_NAMEP(sr_getevtdev()));
                       break;
        }
}
```

Tracing Multiple ISDN Trunks Using Global Call 9

This section describes how to collect ISDN D-channel trace information on multiple trunks.

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- Requirements 56
- Enabling Tracing Using gc_StartTrace( ) 56
- Disabling Tracing Using gc_StopTrace( ) 57
- Reporting Trace Data via GCEV_TRACEDATA 58
- Setting the Trace Queue Size Using gc_SetConfigData( ) 60

9.1 Introduction

The ISDNtrace tool described in Chapter 20, "ISDN Trace Reference" allows you to perform tracing on only one trunk. This procedure allows you to collect ISDN D-channel trace information on two or more trunks at the same time and the capture of the trace information can be dynamically started and stopped via Global Call APIs. The trace information collected with this procedure allows developers to determine the root cause of protocol issues in a system that uses Intel NetStructure® DMT160TEC or DMN160TEC digital telephony interface boards.

Caution: Enabling ISDN tracing on a higher number of trunks will cause the call performance to be severely degraded and must not be left permanently enabled in a production environment.

Trace data are presented to the application via an event (GCEV_TRACEDATA) and the application is responsible for the retrieval, processing, and logging of the traced data from the event. Traced data events will be generated for all signaling frames on the D-channel on both inbound and outbound calls. Tracing is started by using the **gc_StartTrace( )** API after the ISDN firmware downloads. Tracing is stopped using the **gc_StopTrace( )** API. This is described in Section 9.3, "Enabling Tracing Using gc_StartTrace( )", on page 56 and Section 9.4, "Disabling Tracing Using gc_StopTrace( )", on page 57.

The GCEV_TRACEDATA event is received asynchronously on a board device whenever a Layer 2 (LAP_D) INFORMATION frame is sent or received by the firmware. Refer to Chapter 18, "GCEV_TRACEDATA Reference" for more information about the structure of GCEV_TRACEDATA for ISDN.

9.2 Requirements

This feature is only supported on Intel NetStructure® DMT160TEC and DMN160TEC boards.

Caution: Do not permanently enable ISDN tracing on a large number of trunks in a production environment or the call performance will be severely degraded.

Following are the prerequisites for performing this procedure:

- Intel® Dialogic® System Release
- Global Call Protocols
- At least one Intel NetStructure DMT160TEC or DMN160TEC digital telephony interface board

  Note: This feature is only supported on Intel NetStructure DMT160TEC and DMN160TEC boards.
- The following registry setting modification is required to support this feature's functionality:

  HKEY_LOCAL_MACHINE\SOFTWARE\Dialogic\Cheetah\MaxMMBReplySize

  The value should be changed from 0x200 (512 decimal) to 0x400 (1024 decimal).

  If you use this feature without modifying the registry key, you will get the following failure event notifications: GCEV_TASKFAIL.
- The application is responsible for starting and stopping the tracing. This is done using Global Call APIs.
- Traced data will be presented to the application via an event (GCEV_TRACEDATA).
- The application will be responsible for retrieving, processing, and logging the traced data returned as a result of the traced data event.
- System performance dictates the maximum trunks that can be traced. This will be determined empirically.

9.3 Enabling Tracing Using gc_StartTrace( )

The **gc_StartTrace( )** function starts the logging of debug information for a specific line device.

To use this feature, the line device must be the handle for a trunk or virtual board and the tracefilename pointer should be set to NULL. After **gc_StartTrace( )** returns success, instead of logging to a file, the application will be notified of the availability of trace data via GCEV_TRACEDATA. The trace will continue until a **gc_StopTrace( )** function is called.

Sample application code

Note: The following sample code was written for an application running on a system in which an Intel NetStructure DMT160TEC board was used as the network interface, an Intel NetStructure DMV2400A board was used as a play/record resource board, and the boards were connected via a CT Bus.

```
#include <stdio.h>
#include <srllib.h>
#include <gclib.h>
#include <gcerr.h>

LINEDEV bdev;           /* board level device number */
int rc;                 /* Return code */
int value;              /* value to be for specified parameter */
GC_INFO gc_error_info; /* GlobalCall error information data */
char devname[30];       /* Board/Trunk device name */

main()
{
        /* Open a trunk device */
        sprintf(dename, ":N_dtiB1:P_isdn");
        if(gc_OpenEx(&bdev, devname, EV_SYNC, &ldev) != GC_SUCCESS)
        {
                /* Process the error as decided earlier */
                gc_ErrorInfo( &gc_error_info );
                printf ("Error: gc_OpenEx() on devname: %s, GC ErrorValue: 0x%hx - %s,
                       CCLibID: %i - %s, CC ErrorValue: 0x%lx - %s\n",
                       devname, gc_error_info.gcValue, gc_error_info.gcMsg,
                       gc_error_info.ccLibId, gc_error_info.ccLibName,
                       gc_error_info.ccValue, gc_error_info.ccMsg);
                return (gc_error_info.gcValue);
         }

         rc = gc_StartTrace(bdev, NULL);
         if (rc != GC_SUCCESS)
         {
                 /* Process the error */
                 gc_ErrorInfo( &gc_error_info );
                 printf ("Error: gc_StartTrace() on devname: %s, GC ErrorValue: 0x%hx - %s,
                        CCLibID: %i - %s, CC ErrorValue: 0x%lx - %s\n",
                        devname, gc_error_info.gcValue, gc_error_info.gcMsg,
                        gc_error_info.ccLibId, gc_error_info.ccLibName,
                        gc_error_info.ccValue, gc_error_info.ccMsg);
                 return (gc_error_info.gcValue);
          }
          else
          {
                 /* continue */
          }
}
```

9.4 Disabling Tracing Using gc_StopTrace( )

The **gc_StopTrace( )** function stops the logging of debug information for a specific line device that was started using **gc_StartTrace( )**.

To use this feature, the line device must be the handle for a trunk or virtual board. After the **gc_StopTrace( )** function returns success, the application may be notified of the availability of the last remaining trace data via GCEV_TRACEDATA.

Sample application code

Note: The following sample code was written for an application running on a system in which an Intel NetStructure DMT160TEC board was used as the network interface, an Intel NetStructure DMV2400A board was used as a play/record resource board, and the boards were connected via a CT Bus.

```
#include <stdio.h>
#include <srllib.h>
#include <gclib.h>
#include <gcerr.h>

LINEDEV bdev;            /* board level device number */
int rc;                  /* Return code */
int value;               /* value to be for specified parameter */
GC_INFO gc_error_info;   /* GlobalCall error information data */
char devname[30];        /* Board/Trunk device name */

main()
{
        /* Open a trunk device */
        /* Start Tracing */
        .
        .
        /* Call Control activity, tracing captured */
        .
        .
        .
        /* Stop Tracing */
        rc = gc_StopTrace(bdev);
        if(rc != GC_SUCCESS) {
               /* Process the error */
               gc_ErrorInfo( &gc_error_info );
               printf ("Error: gc_StopTrace() on devname: %s, GC ErrorValue: 0x%hx - %s,
                      CCLibID: %i - %s, CC ErrorValue: 0x%lx - %s\n",
                      devname, gc_error_info.gcValue, gc_error_info.gcMsg,
                      gc_error_info.ccLibId, gc_error_info.ccLibName,
                      gc_error_info.ccValue, gc_error_info.ccMsg);
               return (gc_error_info.gcValue);
        } else {
               /* Continue */
        }
}
```

9.5 Reporting Trace Data via GCEV_TRACEDATA

The GCEV_TRACEDATA event is an unsolicited event used to notify the user application of the availability of tracing data. The user application should call **gc_StartTrace( )** successfully to enable receiving tracing data. The trace data is associated with the GCEV_TRACEDATA event via the GC_TRACEDATA data structure, which includes sequence number, data size, and data buffer. This data structure can be obtained by casting extevtdatap of METAEVENT. A proper result value is also associated with GCEV_TRACEDATA, which can be obtained via the **gc_ResultInfo( )** function.

The data structure GC_TRACEDATA associated with the GCEV_TRACEDATA event is defined in gclib.h:

```
#define GCVAL_TRACEDATA_SIZE2048 /* Maximum data size of tracing data */
```

```
typedef struct {
    unsigned long       seq_no;                    /* the sequence number  of tracing data*/
    unsigned short     data_size;                  /* the size of tracing data */
    char         data_buf[GCVAL_TRACEDATA_SIZE];    /* memory buffer for tracing data */
} GC_TRACEDATA, * GC_TRACEDTAP;
```

A new result value GCRV_QUEUE_OVERFLOW associated with GCEV_TRACEDATA event is defined in gcerr.h:

```
#define GCRV_QUEUE_OVERFLOW (GCRV_RESULT | 0x65) /* Queue overflow occurred - data overwritten
*/
```

Sample application code

Note: The following sample code was written for an application running on a system in which an Intel NetStructure DMT160TEC board was used as the network interface, an Intel NetStructure DMV2400A board was used as a play/record resource board, and the boards were connected via a CT Bus.

```
/*
* Do SRL event processing
*/
int    evttype;
char   tracedata[2048];
hdlcnt = 0;
hdls[ hdlcnt++ ] = GetGlobalCallHandle();
hdls[ hdlcnt++ ] = GetVoiceHandle();

/* Wait selectively for devices that belong to this thread */
rc = sr_waitevtEx( hdls, hdlcnt, PollTimeout_ms, &evtHdl);

if (rc != SR_TMOUT)
{
       /*
       * Update
       */
       rc = gc_GetMetaEventEx(&g_Metaevent, evtHdl);
       if (rc != GC_SUCCESS)
       {
              /* process error return */
              gc_ErrorInfo( &gc_error_info );
              printf ("Error: gc_GetMetaEventEx() on linedev: 0x%lx,
                     GC ErrorValue: 0x%hx - %s, CCLibID: %i - %s, CC ErrorValue: 0x%lx - %s\n",
                     metaevent.evtdev, gc_error_info.gcValue, gc_error_info.gcMsg,
                     gc_error_info.ccLibId, gc_error_info.ccLibName,
                     gc_error_info.ccValue, gc_error_info.ccMsg);
              return (gc_error_info.gcValue);
        }
        evttype = metaevent.evttype;
        rc = vProcessCallEvents( );
        switch (evttype)
        {
               case GCEV_TRACEDATA:
               {
                      memcpy((tracedata, metaevent.extevtdatap, sizeof(GC_TRACEDATA) );
                      /* decode the trace data */
                      break;
               }
               .
               .
               .
        }
}
```

9.6 Setting the Trace Queue Size Using gc_SetConfigData( )

The **gc_SetConfigData( )** API is used for setting the size of the trace buffer in the host DM3 call control library if overruns (overflow) occur. If the trace data queue in the host DM3 cclib overflows, the data at the front of the queue will get overwritten and the cause value associated with that data will be set to GCRV_QUEUE_OVERFLOW.

Notes: ***1.*** **gc_GetConfigData( )** can be used to retrieve the trace queue size.

2. Previously, the **gc_GetConfigData( )** and **gc_SetConfigData( )** APIs were not supported on DM3 architecture boards.

To set the trace queue size, the **gc_util_insert_parm_val( )** function must be used to populate the GC_PARM_BLK with the following parameter values:

- setID = CCSET_TRACEDATA
- parmID = CCPARM_TRACEQ_SIZE
- data_size = sizeof(int)
- data = integer value

Once the GC_PARM_BLK has been populated with the desired values, the **gc_SetConfigData( )** function can be issued to perform the configuration. The parameter values for the **gc_SetConfigData( )** function are as follows:

- target_type = GCTGT_CCLIB_NETIF
- target_id = the trunk line device handle
- target_datap = GC_PARM_BLKP parameter pointer, as constructed by the utility function **gc_util_insert_parm_val( )**
- time_out = time interval (in seconds) during which the target object must be updated with the data. If the interval is exceeded, the update request is ignored. This parameter is supported in synchronous mode only, and it is ignored when set to 0.
- update_cond = GCUPDATE_IMMEDIATE
- request_idp = pointer to the location for storing the request ID
- mode = EV_ASYNC for asynchronous execution or EV_SYNC for synchronous execution

Sample application code

Note: The following sample code was written for an application running on a system in which an Intel NetStructure DMT160TEC board was used as the network interface, an Intel NetStructure DMV2400A board was used as a play/record resource board, and the boards were connected via a CT Bus.

```
GC_PARM_BLKP ParmBlkp = NULL;
long id;

gc_util_insert_parm_val(&ParmBlk, CCSET_TRACEDATA, CCPRM_TRACEQ, sizeof(int), 500);
```

Note: The maximum value is 1000 and default is 32.

```
gc_SetConfigData(GCTGT_CCLIB_NETIF, bdev, ParmBlkp, 0, GCUPDATE_IMMEDIATE, &id, EV_ASYNC);
gc_util_delete_parm_blk(ParmBlkp);

if (sr_waitevt(-1) >= 0)
{
       METAEVENT meta;
       gc_GetMetaEvent(&meta);
       switch(sr_getevttype())
       {
               case GCEV_SETCONFIGDATA:
                       printf("Received event GCEV_SETCONFIGDATA(ReqID=%d) on device %s
                       \n",((GC_RTCM_EVTDATA *)(meta.evtdatap))->request_ID,
                       ATDV_NAMEP(sr_getevtdev()));
                       break;
               case GCEV_SETCONFIGDATA_FAIL
                       printf("Received event GCEV_SETCONFIGDATAFAIL(ReqID=%d) on device
                       %s, Error=%s\n",((GC_RTCM_EVTDATA *)(meta.evtdatap))->request_ID,
                       ATDV_NAMEP(sr_getevtdev()),
                       ((GC_RTCM_EVTDATA *)(meta.evtdatap))->additional_msg);
                       break;
               default:
                       printf("Received event 0x%x on device %s\n", sr_getevttype(),
                       ATDV_NAMEP(sr_getevtdev()));
                       break;
        }
}
```

CallInfo Reference 10

This chapter provides reference information about the CallInfo tool. The following topics are included:

- Description. 63
- Guidelines 63
- Options. 64

10.1 Description

The CallInfo tool detects call information using the DM3 board's Telephony Service Provider (TSP) resource. The CallInfo tool confirms that the TSP component is working correctly by monitoring select messages on a per call basis.

10.2 Guidelines

CallInfo is a QScript utility. For more information about QScript utilities, refer to Chapter 27, "QScript Reference".

To use CallInfo, specify the call-related messages you want to monitor as follows:

1. Launch the CallInfo tool from the command line.
2. Click the **Action** menu on the CallInfo display. Highlight **Select Ids** and select the group of call-related events you want to trace. The following menu selections are available:
   - CallInfoSet: TSP-related call messages
   - IE Set: Information elements of ISDN-related messages (focuses on small pieces of information)
   - ISDNMsgSet: ISDN-related messages
3. A window of events specific to the event group that you selected will appear. Select the messages you want to trace by clicking on them.
4. After you select messages, click the **Action** menu and choose **DetectEvt**. The tool will start monitoring the messages you selected. As a new call comes in, it will write over the old call information in the CallInfo display. A separate console window will open that tracks messages coming in and shows the message sequence.
5. If you want to stop tracing events you selected and select other events to trace, click the **Action** menu and select **CancelEvt**. Then follow steps 2 through 4 again.
6. To exit the CallInfo tool completely, select **Action > Exit** or close the window.

10.3 Options

The CallInfo tool uses the following command line options:

-board <n>
: Logical ID of board (required).Use the listboards utility (Linux) or the Configuration Manager (DCM) (Windows) to obtain the board's logical ID.

    Note: The listboards utility is described in the *Administration Guide* for the release and the Configuration Manager is described in the *Configuration Guides* for the (Windows) release.

-line <n>
: Line number that the tool will monitor (optional). The default value is 1.

-chan<n>
: Channel number that the tool will monitor (optional). The default value is 1.

The following example runs the CallInfo tool on board 0, line 1, channel 1:

```
callinfo -board 0 -line 1 -chan 1
```

CAS Trace Reference 11

This chapter provides reference information about the CAS Trace tool.The following topics are included:

- Description. 65
- Guidelines 65
- Options. 65

11.1 Description

The CAS Trace tool enables you to track the bit level transitions on a robbed bit or CAS line. CAS Trace prints messages on the screen in real time. The CAS Trace tool can be configured to output the messages into a circular log file.

The CAS Trace tool is used for troubleshooting problems with an entire span. CAS Trace is used for long-term debugging and logging for problems with timing, hung channels, and improper bit states.

11.2 Guidelines

The CAS Trace tool consumes a portion of the CPU for each trunk that is logged and may generate an exception if CTRL-C is used to exit the tool.

It may take several seconds to start the monitoring on all the trunks

The CAS instance is not valid until the line is in service, so you will have to run an application or the Lineadmin and Phone tools to set the channel in-service before using this application. For information about the Lineadmin tool, refer to the Administration Guide for the software release. For information about the Phone tool, refer to Chapter 25, “Phone Reference”.

11.3 Options

The CAS Trace tool uses the following command line options:

-board <board list>

Logical ID of board (or boards) to trace (optional). The default is the lowest ID present in the system. Use the listboards utility (Linux) or the Configuration Manager (DCM) (Windows) to obtain the board’s logical ID.

Note: The listboards utility is described in the *Administration Guide* for the release and the Configuration Manager is described in the *Configuration Guides* for the (Windows) release.

-line <list of lines>

Line number that the tool will monitor (optional). The default value is 1.

-k <file size>

Size of each file to create in kilobytes (optional). If this option is not present the file size will be infinite.

-# <number of files to create>

The number of files to trace to in a circular fashion. Each file will be the size specified with -k (optional). The default is a single file.

-f <filename>

This will be the base filename. The board, line, and file numbers will be appended to the end of this name (optional). The default is *CasTrace.log*.

-nodisplay

This flag will turn off the screen output to help reduce CPU overhead (optional). The default is to have the screen display on. The display can also be toggled on and off by pressing `d` during runtime.

-t1 / -e1

This flag will tell the system if you are using a T1 protocol or and E1 protocol (optional). The default is T1. If you specify this incorrectly, you may not be able to initialize and monitor the upper channels.

The following will run the CAS Trace tool on boards 0 and 1 for all four spans. Each line will trace to two 1 MB files:

```
CAStrace -board 0 1 -line 1 2 3 4 -# 2 -k 1000
```

The output will look like the example below:

```
[     timestamp    ] B## L## T##  Rx=ABCD  Tx=ABCD  +delta(mS)
---------------------------------------------------------------
[10/29 23:33:33.218] B0  L1  T1   Rx=1100  Tx=0000
[10/29 23:33:33.828] B0  L1  T2   Rx=0000  Tx=0000
[10/29 23:33:33.828] B0  L1  T1   Rx=1100  Tx=1100  +610
[10/29 23:33:34.531] B0  L1  T2   Rx=1100  Tx=0000  +703
[10/29 23:33:34.593] B0  L1  T2   Rx=1100  Tx=1100  +62
[10/29 23:33:34.609] B0  L1  T2   Rx=1100  Tx=0000  +16
[10/29 23:33:34.718] B0  L1  T3   Rx=1100  Tx=0000
[10/29 23:33:35.468] B0  L1  T1   Rx=0000  Tx=1100  +1640
[10/29 23:33:35.500] B0  L1  T3   Rx=1100  Tx=1100  +782
[10/29 23:33:35.562] B0  L1  T1   Rx=0000  Tx=0000  +94
[10/29 23:33:35.656] B0  L1  T4   Rx=1100  Tx=0000
[10/29 23:33:35.656] B0  L1  T1   Rx=0000  Tx=0000  +94
[10/29 23:33:36.625] B0  L1  T5   Rx=1100  Tx=0000
[10/29 23:33:36.843] B0  L1  T1   Rx=1100  Tx=0000  +1187
[10/29 23:33:36.906] B0  L1  T1   Rx=1100  Tx=1100  +63
[10/29 23:33:36.921] B0  L1  T1   Rx=1100  Tx=0000  +15
[10/29 23:33:37.203] B0  L1  T3   Rx=0000  Tx=1100  +1703
[10/29 23:33:37.328] B0  L1  T6   Rx=1100  Tx=0000
[10/29 23:33:37.328] B0  L1  T3   Rx=0000  Tx=0000  +125
[10/29 23:33:37.421] B0  L1  T3   Rx=0000  Tx=0000  +93
[10/29 23:33:37.843] B0  L1  T4   Rx=1100  Tx=1100  +2187
[10/29 23:33:37.875] B0  L1  T2   Rx=1100  Tx=1100  +3266
[10/29 23:33:37.875] B0  L1  T5   Rx=1100  Tx=1100  +1250
```

The output is separated into the following columns:

- Timestamp - the time at which the event is received down to msec
- B## - the board’s logical ID
- L## - the line number
- T## - the timeslot
- Rx=ABCD - the state of the Receive bits
- Tx=ABCD - the state of the Transmit bits
- Delta - the time between the last transition in msec (if this is blank, it is the initial bit state)

DebugAngel Reference 12

This chapter provides reference information about the DebugAngel tool. The following topics are included:

- Description 69
- Guidelines 69
- Command Line Options. 69
- Additional Configuration Options 70

12.1 Description

The DebugAngel tool provides low-level firmware tracing to aid in low-level debugging. Running as a Windows service or Linux Daemon, it polls the DM3 boards in the system and posts **qPrintf( )** statements from the resources and DM3 kernel to a log file.

12.2 Guidelines

Once the service is running, no further action is needed. Any changes to your system (for example, new boards) are automatically detected. On a Windows system, information is logged to the file *DebugAngel.log* in the *%INTEL_DIALOGIC_DIR%\log* directory. On a Linux system, information is logged to the file *debugangel.log* in the *${INTEL_DIALOGIC_DIR}/log* directory.

12.3 Command Line Options

This section explains the command line options that can be used with the DebugAngel tool.

To install the service and start it running in automatic mode, enter the command:

```
DebugAngel -install
```

The DebugAngel tool uses the following options when it is invoked from the command line.

Notes: ***1.*** Command line options are mutually exclusive.

2. On Linux systems, you must start DebugAngel from *${INTEL_DIALOGIC_DIR}/bin*.

-instonly
: Installs the service without starting it.

-start
: Starts the service.

-stop
: Stops the service.

-manual
Changes the service startup mode to manual.

-auto
Changes the service startup mode to automatic (default).

-remove
Removes the service (and stops it if it was started).

-status
Shows the service status.

12.4 Additional Configuration Options

Additional configuration options for DebugAngel are available under the Windows registry key *HKEY_LOCAL_MACHINE\SOFTWARE\Dialogic\DebugAngel*.

Warning: Incorrect manipulation of the Windows registry can render your system unusable, requiring that you reinstall Windows. Only a system administrator qualified to modify the registry should change the DebugAngel configuration.

The configuration options in the registry include:

DebugLevel -> 0
1 writes the log information to DebugView.

MaxFileSize -> 0
0 = no max. When the max size is reached, the file is truncated to 0.

LogFile -> default file name

AutoRename -> 1
1 (default) avoids erasing the file when the computer is restarted; the file is renamed (name).bak. Other options are: 0 = don't back up 2 = rename file to (name).(Day/Time_String) 3 = uses multiple files.

MaxFiles -> 1
Used by AutoRename 3 (default is 1 file).

Diagnostics Management Console (DMC) Reference 13

This chapter describes the Diagnostics Management Console (DMC) GUI. The following information is included:

- Description 71
- Guidelines 72
- DMC Main Window 72
- DMC Configuration Dialog 74

Procedures for using the DMC are provided in Chapter 3, "Using the Diagnostics Management Console (DMC)".

13.1 Description

The Diagnostics Management Console (DMC) provides a single portal from which you can launch the diagnostic tools supplied with Intel® telecom software. The DMC also enables you to locate the log files produced by these tools and view them with the appropriate viewer.

The DMC allows you to launch the diagnostic tools remotely through the standard remote control methods provided with the operating system, such as SSH or Remote Desktop.

The DMC performs the following:

- Lists the available diagnostic tools for execution both locally and remotely
- Lists the diagnostic logs available both locally and remotely for viewing
- Launches the diagnostic tools, which execute within their own environment both locally and within the constraints of the integrated remote management facilities of the operating system or an integrated third party provider
- Launches viewers for displaying logged diagnostic data
- Maintains the association of diagnostic log files to appropriate viewers
- Presents error messages when it encounters errors during runtime

Details about using each diagnostic tool are provided in the other chapters of this document. Procedures for using the DMC are provided in Chapter 3, "Using the Diagnostics Management Console (DMC)".

13.2 Guidelines

When you launch the DMC, you will see a list of the available diagnostic tools and log files. The DMC provides an easy means of accessing the tools and log files from one central location, but you must know what you want to do with a given tool or log file and how to use it. Information about diagnostic tasks and tools is provided in this Diagnostics Guide.

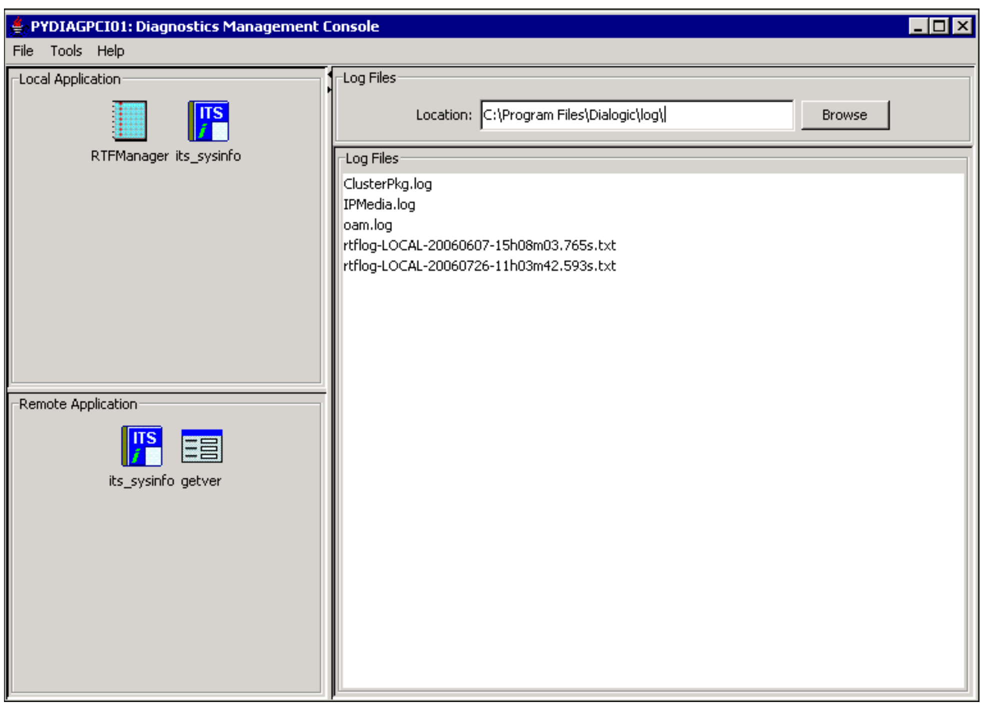
13.3 DMC Main Window

The main window of the Diagnostics Management Console (DMC) is the first window you see after launching the DMC (see Figure 5).

This window consists of the following parts:

- Menu Bar
- Diagnostic Application Panels (local and remote)
- Log File Panel

Figure 5. DMC Main Window



13.3.1 Menu Bar

The main window of the DMC has a menu bar along the top part of the window. This menu bar allows you to access several drop-down menus. Most actions on these menus can also be performed using shortcut keys. The menus, menu items, and shortcut keys are as follows:

File

- **Open log file (CTRL+O)** - Opens the log file that is selected (highlighted) in the log file panel.
- **Execute application (F5)** - Launches the diagnostic tool that is selected (highlighted) in the application panel. For more information about each tool, refer to the tool reference chapters in this Diagnostics Guide.
- **Exit (CTRL+X)** - Closes the DMC.

Tools

- **Configuration (F4)** - Allows you to modify settings for the DMC. For more information, refer to Section 13.4, “DMC Configuration Dialog”, on page 74.

Help

- **Contents (F1)** - Displays online help that describes the DMC and explains how to use the DMC.

13.3.2 Diagnostic Application Panels

On the left side of the Diagnostics Management Console (DMC) main window are two panels: the top panel lists local diagnostic applications and the bottom panel lists remote diagnostic applications. Remote diagnostic applications will be listed only if the DMC has been configured to launch diagnostic applications remotely (see Section 13.4, “DMC Configuration Dialog”, on page 74).

For instructions on launching diagnostic applications, refer to one of the following:

- Section 3.2, “Launching a Diagnostic Tool”, on page 23 (for local machine)
- Section 3.3, “Launching a Diagnostic Tool on a Remote Machine”, on page 24

Note: The terms “diagnostic application” and “diagnostic tool” both refer to the diagnostic tools provided with the Intel telecom software.

13.3.3 Log File Panel

The log file panel is on the right side of the Diagnostics Management Console (DMC) main window. This panel allows you to select a log file to view.

Viewing a log file

To view a log file, locate the file you want in the log file list, click on it to highlight it, and then press **Enter** *or* select **Open log file** from the **File** menu *or* use the **CTRL+O** shortcut. You can also double-click on the log file name to view it. The viewer that is associated with a given log file and located on the local machine will be used to view the log file.

Listing of log files on the local machine

The log file panel of the DMC lists the diagnostic log files available for viewing based on the directory path entered on the DMC Configuration Dialog.

Specifying a different location for log files

You can use the **Browse** button on the log file panel to locate log files. However, if you want to change the default location in which the DMC will look for log files, you can specify it on the DMC Configuration Dialog. You can access the DMC Configuration Dialog by selecting **Configuration** from the **Tools** menu *or* pressing **F4**. A **Browse** button allows you to select a directory for the Log File Directory field.

Note: If the user-defined variable is empty or not valid, the DMC will use the environment variable set up during installation of the Intel telecom software: INTEL_DIALOGIC_DIR/log.

Listing of log files over the network

The DMC can list log files from mapped drives over the network. You must set this up on the DMC Configuration Dialog. You can access the DMC Configuration Dialog by selecting **Configuration** from the **Tools** menu *or* pressing **F4**.

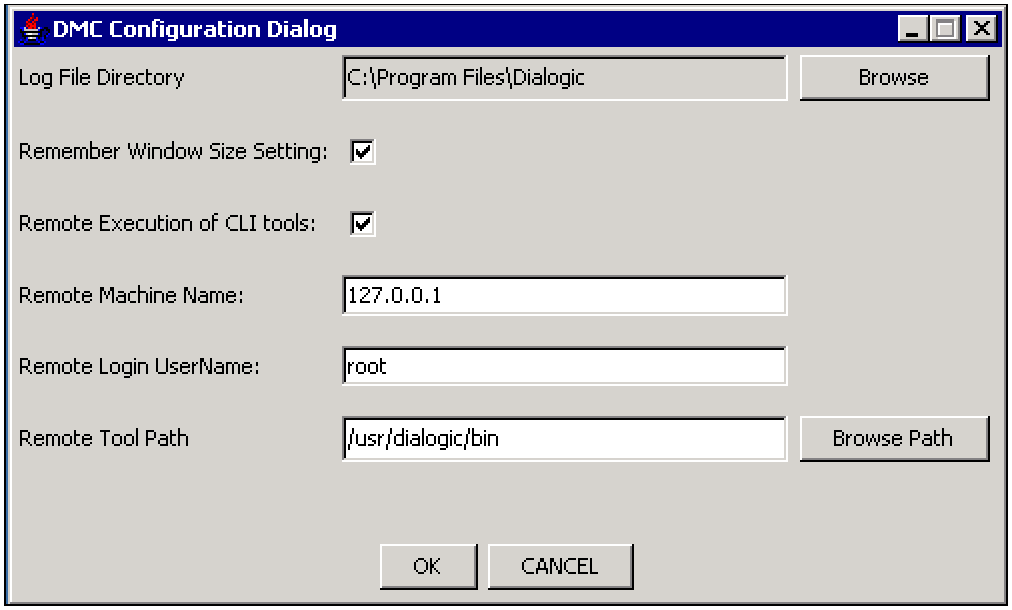
Display of error conditions

Whenever the DMC encounters an error while opening a log file for viewing, it will poll the standard error stream of the operating system for the error message and display it to you.

13.4 DMC Configuration Dialog

The DMC Configuration Dialog (Figure 6) allows you to modify settings for the Diagnostics Management Console (DMC). You must modify these settings if you want to use a diagnostic tool on a remote machine, change the path to the log file directory, or preserve window size settings. You can access the DMC Configuration Dialog by selecting **Configuration** from the **Tools** menu *or* pressing **F4**.

Figure 6. DMC Configuration Dialog



You can modify the following settings using the DMC Configuration Dialog:

- **Log File Directory**: This field shows the location where the DMC will search for log files. If this field is empty or invalid, the DMC will use the environment variable INTEL_DIALOGIC_LOG to specify the log file directory. This field is read-only by default. A **Browse** button allows you to select a directory for this field.
- **Window Size Settings**: A checkbox setting allows you to choose whether you want the DMC to remember its width and height settings since its last run. If you check this box, the next time DMC loads, it will load the window size from its previous execution. If you do not check this box, the DMC will load using the default value for width and height: 800 X 600 pixels.
- **Remote Execution of CLI Tools**: A checkbox setting allows you to use the DMC to execute diagnostic tools remotely via Command Line Interface (CLI). If you check this box, you will see (on the main screen) a list of all the diagnostic tools available to execute via CLI from a remote machine. If you do not check this box, you will not see a list of diagnostic tools available for remote use and you will not be able to use the diagnostic tools remotely.
- **Remote Machine Name**: If you want to use diagnostics tools on a remote machine, you must enter the name of the remote machine here. The DMC will pass on this machine name to remote methods such as SSH to connect to remote machines. If this field is not empty, the DMC will try to use the machine name with remote tools. If the field is empty, when you attempt remote execution the DMC will launch a dialog box in which you can provide the machine name. In either case, if the machine name is invalid, the DMC will show an error and discontinue execution of the remote tool.
- **Remote Login UserName**: You must enter the user name used for logging into the remote machine.
- **Remote Tool Path**: You must specify the path of the diagnostic tool that you will use remotely via a CLI. You can use the **Browse Path** button to specify the path.

The DMC configuration settings are stored in a *dmc.properties* file even when the DMC is shut down. When you start the DMC, it will reload the settings from this file. If this file is not found or cannot be read for any reason, the DMC will use default values hard coded in the application. If there is an error in saving the file for any reason (for example, unavailable disk space or I/O errors of any kind), the DMC will notify you and abort saving the values.

DigitDetector Reference 14

This chapter provides reference information about the DigitDetector tool.The following topics are included:

- Description. 77
- Guidelines 77
- Options. 77

14.1 Description

The DigitDetector tool demonstrates the use of a DM3 board's Tone Generator and Signal Detector components. It provides the ability to detect digits at the local end of a channel connection.

14.2 Guidelines

DigitDetector is a QScript utility. For more information about QScript utilities, refer to Chapter 27, "QScript Reference".

To use the DigitDetector tool, you need a physical connection to the board. For example, two network interface trunks can be looped or you might use a connection between end users. You can then use the Phone tool at one end of the channel to generate dialed digits that can be detected by the Digit Detector tool. For information about the Phone tool, refer to Chapter 25, "Phone Reference".

14.3 Options

The DigitDetector tool uses the following command line options:

-board <n>

Logical ID of board (required).Use the listboards utility (Linux) or the Configuration Manager (DCM) (Windows) to obtain the board's logical ID.

Note: The listboards utility is described in the *Administration Guide* for the release and the Configuration Manager is described in the *Configuration Guides* for the (Windows) release.

-line <n>

Line number that the tool will monitor for digits (optional). The default value is 1.

-chan<n>

Channel number that the tool will monitor for digits (optional). The default value is 1.

The following example runs the DigitDetector tool on board 0, line 1, channel 1:

```
digitdetector -board 0 -line 1 -chan 1
```

Dlgsnapshot Reference 15

This chapter provides reference information about the Dlgsnapshot tool. The following topics are included:

- Description. 79
- Guidelines 79
- Options. 80

15.1 Description

The Dlgsnapshot tool uses Intel® Dialogic® system software fault monitoring components to generate a core dump file when one of the following faults is detected on a DM3 board:

- Control Processor (CP)
- Signal Processor (SP)

The autodump feature of the Dlgsnapshot tool is disabled by default. However, you can enable the autodump feature if you want to use it. In the default state, no board or DSP will be automatically reset as a result of a DSP failure.

If autodump is enabled, when a fault is detected, a core dump file is created in the *log* directory under *INTEL_DIALOGIC_DIR* and the board that the fault occurred on is taken out of service (stopped) without causing any other interruptions to the system. To reactivate the out-of-service board, you must restart it.

You can also run the Dlgsnapshot tool on demand from the command line.

Note: Dlgsnapshot is for use only on Intel® Dialogic® or Intel NetStructure® boards with a DM3 architecture. However, the SRAM dump is not supported on The Intel NetStructure® DMV-B, DMN160TEC, and DMT160TEC boards.

15.2 Guidelines

Windows systems: When a core dump file is generated, you can send a *.zip* file containing the contents of the *%INTEL_DIALOGIC_DIR%\log* directory along with the Windows event viewer system log file (**.evt*) to Intel's telecom support resources for debugging purposes.

Linux systems: When a core dump file is generated, you can send a *.tar* file containing the contents of the *${INTEL_DIALOGIC_DIR}/log* directory to Intel's telecom support resources for debugging purposes.

When boards are downloaded and you run Dlgsnapshot manually, a question is posed about running diagnostic firmware. You must confirm that you want Dlgsnapshot to stop the running board and download diagnostic firmware.

Each core dump file is named according to the type of fault detected and the date/time the fault occurred. The naming convention of the core dump files is

```
faulttype_MM_DD_YY HH_NNxx_MS
```

where:

- *faulttype* denotes the type of fault (CPDump, SPDump, Counter [Windows only], or Driver State)
- *MM* is a two-digit number indicating the month
- *DD* is a two-digit number indicating the day
- *YY* is a two-digit number indicating the year
- *HH* is a two-digit number indicating the hour
- *NN* is a two-digit number indicating the minute
- *xx* indicates whether the fault occurred din the AM or PM
- MS is a number indicating the milliseconds

Note: If multiple DSPs on the same board generate a fault, the core dump file will only contain information about the DSP that generated the initial fault.

Following are some examples of file names:

- CounterDump_11_03_2003 03_13PM_35
- StateDump_11_03_2003 03_13PM_35

All the dump files have a **.txt* extension except the SRAM dump in Windows, which has a **.bin* extension.

15.3 Options

This section contains the following information:

- Enabling Autodump
- Running Dlgsnapshot on Demand
- Command Line Options

15.3.1 Enabling Autodump

If you want to enable autodump, open the *dlgproductagent.cfg* file located in the *cfg* directory and uncomment out the following line:

```
DIAGNOSTIC_AGENT    = libdlgdm3diagagent
```

The default looks like this (the line you must change is in bold):

```
[DM3]
;DETECTOR_AGENT      = libdlgdm3detectoragent
FAULTDETECTOR_AGENT = libdlgdm3faultdetectoragent
;INITIALIZER_AGENT   = libdlgdm3initializeragent
;CLOCKING_AGENT      = libdlgdm3clockagent
;DIAGNOSTIC_AGENT    = libdlgdm3diagagent
```

You must change it to the following (bold text shows the changed line):

```
[DM3]
;DETECTOR_AGENT      = libdlgdm3detectoragent
FAULTDETECTOR_AGENT = libdlgdm3faultdetectoragent
;INITIALIZER_AGENT   = libdlgdm3initializeragent
;CLOCKING_AGENT      = libdlgdm3clockagent
DIAGNOSTIC_AGENT    = libdlgdm3diagagent
```

When you make this change, Dlgsnapshot will run automatically when a fault is detected.

15.3.2 Running Dlgsnapshot on Demand

The Dlgsnapshot tool can also be run on demand from the command line. SeeSection 15.3.3, “Command Line Options”, on page 81. Running Dlgsnapshot from the command line may also stop the board, depending on the options selected.

If you try to run the Dlgsnapshot tool on a board version that doesn’t support it, you will get a message that Dlgsnapshot is not supported and the command failed.

15.3.3 Command Line Options

The Dlgsnapshot tool uses the following command line options:

-f<number 1 to 6>
: This option, which is **mandatory**, indicates which print buffer will be dumped. Values are as follows:
  - 1 – SRAM (not applicable to all releases)
  - 2 – DRIVER_BOARD_STATE_DUMP
  - 3 – DRIVER_BOARD_COUNTER_DUMP (Windows only)
  - 4 – DOWNLOAD_OFFDIAG
  - 5 – PROCESSOR_DUMP_ONLY (this value requires that you use the `-r` option)
  - 6 – DUMP_ALL (this value requires that you use the `-r` option)

-a<AUID>
: Dumps the print buffer of the processor specified with the `-r` option on the board with the given Addressable Unit IDentifier (AUID).

-r<processor number>
: The `-r` option is mandatory with `-f` option 5 or 6.

-l<logical ID>
: Dumps the print buffer of the processor specified with the `-r` option on the board with the given logical ID.

-p<physical slot number>

Dumps the print buffer of the processor specified with the `-r` option on the board with the given physical bus number.

-b<PCI bus number> -s<PCI slot number>

Dumps the print buffer of the processor with the `-r` option on the board with the given PCI bus number and given PCI slot number.

-h

Displays the help screen.

-v

Displays the version number of Dlgsnapshot.

The following shows the usage of the command and its options:

```
dlgsnapshot [-a -r -f] [-l -r -f] [-p -r -f] [-b -s -r -f] [-h] [-v]
```

Example: To dump all for a board with AUID=50002 r1 (CP), you would use the following:

```
dlgsnapshot -a50002 -r1 -f6
```

Example: To dump all for a board with AUID=50002 r2 (SP2), you would use the following:

```
dlgsnapshot -a50002 -r2 -f5
```

DM3Insight Reference 16

This chapter provides information about the DM3Insight tool.

DM3Insight is a tool used to capture message and stream traffic from the DM3 device driver. DM3Insight can be used for the following:

- Debugging/understanding applications, driver, kernel by capturing traffic and analyzing the trace output
- Viewing messages that are encountered only between the device driver and the DM3 board
- Eliminating orphan messages and streams
- Calculating the turnaround time for messages
- Viewing messages from the board that have incorrect source/destination address or transaction Id and therefore never reach the application
- Viewing error messages from the board like Std_MsgError or QMsgUndelivered, which are not handled (or reported) by simple applications

For complete information about configuring and using the DM3Insight tool, refer to the DM3Insight online help file (*DM3Insight.chm*). The default directory for this file is %INTEL_DIALOGIC_DIR%\bin[1] for Windows* systems.

1. To find out what the INTEL_DIALOGIC_DIR directory is, type `echo %INTEL_DIALOGIC_DIR%` on a command prompt and note the path displayed.

DM3post Reference 17

This chapter provides reference information about the DM3post tool. The following topics are included:

- Description. 85
- Guidelines 85
- Options. 86

A procedure for using this tool is provided in Section 4.2, "Checking an Individual Board", on page 27.

17.1 Description

The DM3post tool, sometimes referred to as "POST-on-demand", can perform diagnostics on a stopped board at any time to detect and isolate possible hardware faults.

Note: This tool can be run on Intel NetStructure® on DM3 architecture boards and Intel NetStructure® IPT Series boards.

17.2 Guidelines

The board must be in a "stopped" state before the DM3post tool can be run. If you do not use the reset option (`-r`), DM3post will *not* reset the board and will only retrieve the POST results for the last reset that occurred. If you use DM3post with the reset option, DM3post will force a full reset of the specified board, forcing the Control Processor (CP) POST diagnostics to run. DM3post will then retrieve the POST results from the SRAM and provide a PASS/FAIL indication to you. The board will remain in a stopped state, so you must restart the board.

DM3post also provides an option to run POST on a chassis level. By using the chassis option (`-c`), DM3post will retrieve the results of the last run POST for all DM3 boards in the chassis. By using the chassis option with the reset option, you can run POST on all DM3 boards in the system. When using the chassis option, it is not necessary to provide the bus and slot numbers. Any option other than the reset option will be ignored when using the chassis option. In addition to output on the screen, more detailed output is logged to a log file, *dm3post.log*, by default.

Notes:

1. Signal Processors (SP) are not diagnosed by DM3post. However, SP health is verified as part of the board's download process. Therefore sufficient diagnostic coverage for hardware is obtained when a board passes POST and is successfully downloaded.
2. On Windows systems, for For the slot number (-s option), provide the PCI slot number. This information may be obtained from the Configuration Manager (DCM), which is described in the Configuration Guides for the release. On Linux systems, for the slot number, provide the physical slot number. This information may be obtained from the listboards utility, which is described in the *Administration Guide* for the release.

17.3 Options

The following command line options are used with the DM3post tool:

-s<n>
: slot number (required). On Windows systems, use Use the Configuration Manager (DCM) to obtain the board's slot number. On Linux systems, use the listboards utility, which is described in the *Administration Guide* for the software release.

> ***Note:*** The listboards utility is described in the *Administration Guide* for the release and the Configuration Manager is described in the *Configuration Guides* for the (Windows) release.

-b<n>
: bus number (optional if there is only one bus *or* if the slot number is unique)

-l
: logs event (optional). Output is logged to *dm3post.log*.

-q
: suppresses output (optional). The tool operates in silent mode.

-r
: resets board before retrieving diagnostics results (optional). If not set, results displayed will be those generated at board startup.

-h
: displays the tool's help screen

-v
: displays the program version

Example 1: Run DM3post on a board in slot 17, bus 0

The following example runs DM3post on a board in slot 17, bus 0:

```
dm3post -s17 -b0
```

You will get the following response:

```
You have chosen to read the initial POST diagnostic results from the board in slot 17, bus 0. No
board reset will occur.

Do you wish to continue (y/n)?
```

If you answer Y, the following will be printed to the screen:

```
Retrieving results...
```

The success/failure message will be printed to the screen when POST is complete. Here is an example:

```
SUCCESS: POST passed for board in slot 17, bus 0. Diagnostic Codes: 0x03 0xfc
```

Example 2: Dm3 post run with the reset option on a board in slot 17, bus 0

The following example runs DM3post with the reset option on a board in slot 17, bus 0:

```
dm3post -s17 -b0 -r
```

You will get the following response:

```
You have chosen to run diagnostics on the board in slot 17, bus 0.

Do you wish to continue (y/n)?
```

If you answer Y, the following will be printed to the screen:

```
dm3post processing...
```

The success/failure message will be printed to the screen when POST is complete. Here is an example:

```
SUCCESS: POST passed for board in slot 17, bus 0. Diagnostic Codes: 0x03 0xfc
```

GCEV_TRACEDATA Reference 18

This chapter describes the data layout in the GCEV_TRACEDATA event so that a parser can be designed. This chapter also provides a sample parser and sample output. This information is provided in the following sections:

- Description. 89
- Structure of Data - Tracing CAS Signaling 89
- Structure of Data - Tracing ISDN Trunks 91
- Payload Formats 91
- Sample Parser 94
- Sample Parser Output 102

18.1 Description

Inbound and outbound R2MF tones and CAS bit transitions/states can be traced using Global Call APIs and the GCEV_TRACEDATA event. The GCEV_TRACEDATA event is received on a board device whenever the trace buffer maintained by the firmware is full. The size of the maximum data received with this event will not exceed 1000 bytes.

For ISDN, the GCEV_TRACEDATA is generated for every ISDN frame received or transmitted. The size of the maximum data received will not exceed the maximum allowable Layer 2 frame size of 260 bytes.

This chapter describes the data layout in the GCEV_TRACEDATA so that a parser can be designed. The actual data content refers to actions/state changes occurring on a particular trunk/channel. The data comes from an Intel® telecom product's firmware in response to either a call being presented to an Intel telecom board or an application trying to initiate a call through the Intel telecom board.

For information about performing the tracing, refer to Chapter 8, "Tracing CAS Signaling Using Global Call" or Chapter 9, "Tracing Multiple ISDN Trunks Using Global Call". This chapter describes the trace data.

Note: This tracing procedure is only relevant to systems using an Intel NetStructure DMT160TEC digital telephony interface board.

18.2 Structure of Data - Tracing CAS Signaling

Table 1 shows the structure of the data, listing the fields and size of each field. A description of the fields follows the table.

Table 1. Structure of Data - Tracing CAS Signaling

Field	Size of Field
Data Type	1
Timestamp	4
Length of Payload / Channel Number*	2
Payload	N
Data Type	1
Timestamp	4
Length of Payload / Channel Number	2
Payload	N
... ...	...
*The most significant 5 bits represent the channel number and the least significant 11 bits represent the length of the payload.	

Following are descriptions of the fields listed in Table 1:

Data Type

This field describes the type of data in the payload following it. At this time, the firmware supports four data types:

- 02H is CAS data
- 04H is R2MF tone data
- 08H is SigDet ON data
- 10H is SigDet OFF data

More information on data types is provided in Section 18.4, “Payload Formats”, on page 91.

Timestamp

This field is a 4 byte field (unsigned 32 bit integer) representing the number of firmware timer ticks since the board was started. Each tick is equivalent to 4 milliseconds. This field is encoded in the Little Endian format[1].

Length of payload/Channel number

This field is a 2 byte field (unsigned 16 bit integer) whose most significant 5 bits represent the channel number and least significant 11 bits represent the length of the payload starting at the next byte. This field is encoded in the Little Endian format[1].

Payload

This field is a number of bytes (number specified by the “length of payload” field above) representing the event that occurred in the firmware.

1. The least significant byte of the number is stored in the lowest memory address, and the most significant byte of the number is stored in the highest memory address.

18.3 Structure of Data - Tracing ISDN Trunks

Table 2 shows the structure of the data, listing the fields and size of each field. A description of the fields follows the table.

Table 2. Structure of GCEV_TRACEDATA Data for ISDN

Field	Size of Field
Send/Receive Flag	4
Timestamp	4
Payload	N

Following are descriptions of the fields listed in Table 1-3:

Send/Receive Flag
: When this field has a value of 01, it indicates a frame sent by the firmware to the network. When this field has a value of 02, it indicates a frame received by the firmware from the network.

Timestamp
: This field is a 4 byte field (unsigned 32 bit integer) representing the number of firmware timer ticks since the board was started. Each tick is equivalent to 4 milliseconds. This field is encoded in the Little Endian format (the least significant byte of the number is stored in the lowest memory address, and the most significant byte of the number is stored in the highest memory address).

Payload
: This field is a number of bytes representing the event that occurred in the firmware.

18.4 Payload Formats

This section describes the payload formats for CAS and ISDN:

- CAS Payload Formats
- ISDN Payload Format

18.4.1 CAS Payload Formats

The firmware currently supports four data types. This section describes how to decode the payload field for each data type:

- CAS Data (data type field = 02H)
- R2MF Data (data type field = 04H)
- SigDet ON Data (data type field = 08H)
- SigDet OFF Data (data type field = 10H)

CAS Data (data type field = 02H)

This data type represents an event indicating a raw transition detected by the firmware. The structure of the payload is as follows:

```
struct CAS_Transition {
       unsigned int32         Label;
       unsigned int8          PreTransitionCode;
       unsigned int8          PostTransitionCode;
       unsigned int32         Direction;
       unsigned int32         Timestamp;
};
```

Terms in the above payload structure are defined as follows:

Label
: Label is significant to the firmware only. It can be ignored by the host application receiving the GCEV_TRACEDATA event.

PreTransitionCode
: The code prior to the transition.

PostTransitionCode
: The code after the transition.

Direction
: The direction in which the transition was detected (inbound=1, outbound=2).

Timestamp
: The time that the transition was detected in milliseconds.

R2MF Data (data type field = 04H)

This data type represents a tone that is represented by the following structure:

```
struct R2MF_Tone        {
      unsigned int8     Trunk;
      unsigned int8     Channel;
      unsigned int8     ToneID;
};
```

Terms in the above structure are defined as follows:

Trunk
: The trunk number on which the tone was received.

Channel
: The channel number on which the tone was received.

ToneID
: The identifier for the tone.

SigDet ON Data (data type field = 08H)

This data type represents an MF or DTMF signal ON condition in the firmware Signal Detector, and is represented by the following structure:

```
struct SigDet_ON {
        unsigned int32            EventLabel;
        unsigned int32            SignalId;
        unsigned int8       SignalLabel[4];
        unsigned int8       LabelSize;
        unsigned int8       RepCount;
        unsigned int16             Freq1;
        unsigned int16             Freq2;
        unsigned int32             OnTime;
        unsigned int32             OffTime;
};
```

Terms in the above structure are defined as follows:

EventLabel
: EventLabel is significant to the firmware only. It can be ignored by the host application receiving the GCEV_TRACEDATA event.

SignalID
: SignalID identifies the signal that triggered.

SignalLabel
: An array of bytes that identifies the signal that triggered.

LabelSize
: The number of valid unsigned int8's in SignalLabel.

RepCount
: The number of times this signal was detected.

Freq1
: The actual frequency in Hz of tone 1 detected.

Freq2
: The actual frequency in Hz of tone 2 detected.

OnTime
: The actual ON time in 10 msec units.

OffTime
: The actual OFF time in 10 msec units.

SigDet OFF Data (data type field = 10H)

This data type represents an MF or DTMF signal OFF condition in the firmware Signal Detector, and is represented by the following structure:

```
struct SigDet_OFF     {
     unsigned int32        EventLabel;
     unsigned int32        SignalId;
     unsigned int8     SignalLabel[4];
```

```
    unsigned int8     LabelSize;
};
```

Terms in the above structure are defined as follows:

EventLabel
: EventLabel is significant to the firmware only. It can be ignored by the host application receiving the GCEV_TRACEDATA event.

SignalID
: SignalID identifies the signal that triggered.

SignalLabel
: An array of bytes that identifies the signal that triggered.

LabelSize
: The number of valid unsigned int8's in SignalLabel.

18.4.2 ISDN Payload Format

The payload contains the raw contents of the frame received or sent by the firmware to/from the network; i.e., it contains a frame in ISDN Layer 2 format as described in the LAP-D specification or ITU-T document Q.921 (found at http://www.itu.int/home/index.html). If this Layer 2 frame is an INFORMATION frame, it may further encapsulate an ISDN Layer 3 frame, whose format is described in ITU-T document Q.931 (also found at http://www.itu.int/home/index.html). An example of a payload containing a Layer 2 frame encapsulating a Layer3 SETUP frame is shown below.

```
                 Encapsulated
                 Layer 3 SETUP
 Layer 2         Frame
|<------->| |<---------------->
02 01 00 00 08 02 6e f5 05 04
03 80 90 a2 18 03 a9 83 81 6c
06 21 83 31 32 33 34 70 05 81
32 30 30 32
```

18.5 Sample Parser

The following is an example of how to parse the raw data content passed back as part of the tracing of inbound and outbound R2MF tones and CAS bit transitions/states. Sample output of the parser is also provided for reference (see Section 18.6, "Sample Parser Output", on page 102). You can copy this example or design your own parser.

Note: This does not apply to ISDN trace formatting.

```
//
//     mdfParseCAS.c
//
//     Takes a CAS Trace file & parses it to text
//     Ideally allow selective output on a per timeslot basis

//     Relies on tracing application logging:
```

```
//                      TraceData->seq_no               (unsigned long)
//                      TraceData->data_size    (unsigned short)
//                      TraceData->data_buf             (char[data_size])
//
//      Ideally allow selective output on a per timeslot basis
//

#include <stdio.h>
#include <stdlib.h>
#include <ctype.h>
#include <conio.h>
#include <string.h>


#define CAS_DATA      0x02
#define R2MF_TONE     0x04
#define SIGDET_ON     0x08
#define SIGDET_OFF    0x10

FILE    *hInFile;
FILE    *hOutFile;


// Function Prototypes
void    mdfProcessCas(void);
void    mdfProcessR2mf(void);
void    mdfProcessToneOn(void);
void    mdfProcessToneOff(void);
void    mdfProcessTimestamp(void);
char*   mdfLsNibble2Bin(unsigned char Code);
char*   mdfMsNibble2Bin(unsigned char Code);
char*   mdfByte2Bin(unsigned char Code);
void    mdfReadError(char* szMsg);


void main(int argc, char *argv[])
{
        unsigned long   iSeq;
        unsigned long   iSeqCheck = 1;
        unsigned short  iSize;
        unsigned char   iType;
        fpos_t                  iPos;
        fpos_t                  iPayloadEnd;


        // Test Source File is Specified
        if(argc < 2)
        {
                printf("Input File Not Specified\n");
                printf("Usage:  %s InputFile\n", argv[0]);
                return;
        }

        // Open Source File
        if((hInFile = fopen(argv[1], "rb")) == NULL)
        {
                printf("File Open Failed On %s\n", argv[1]);
                return;
        }

        // add a .txt to the input filename
        strcat(argv[1], ".parsed.txt");

        // create output file
        if((hOutFile = fopen(argv[1], "w")) == NULL)
        {
                printf("File Open Failed On %s\n", argv[1]);
```

```
                return;
        }

        printf("Seq#    Bytes\n");

        // get seq
        while(fread(&iSeq, sizeof(unsigned long), 1, hInFile) == 1)
        {
                // get size of payload
                if(fread(&iSize, sizeof(unsigned short), 1, hInFile) != 1)
                {
                        mdfReadError("Payload Size");
                }

                printf("%3u     %4u\n", iSeq, iSize);

                fprintf(hOutFile, "# Timestamp  Chan TxABCD RxABCD TxR2 RxR2      Sequence No.
%u #\n", iSeq);

                fgetpos(hInFile, &iPos);

                iPayloadEnd = iPos + iSize;

                // process payload
                while(iPos < iPayloadEnd)
                {
                        // get data type label
                        if(fread(&iType, sizeof(unsigned char), 1, hInFile) != 1)
                        {
                                mdfReadError("Type Label");
                        }

                        // process timestamp
                        mdfProcessTimestamp();

                        // process data based on type
                        switch(iType)
                        {
                                case CAS_DATA:
                                        mdfProcessCas();
                                        break;
                                case R2MF_TONE:
                                        mdfProcessR2mf();
                                        break;
                                case SIGDET_ON:
                                        mdfProcessToneOn();
                                        break;
                                case SIGDET_OFF:
                                        mdfProcessToneOff();
                                        break;
                                default:
                                        break;
                        }
                        fgetpos(hInFile, &iPos);
                }
        }
        mdfReadError("Normal Exit");
}


void mdfProcessCas(void)
{
        unsigned short  LenChan;
        unsigned long   Label;
        unsigned char   PreCode;
        unsigned char   PostCode;
        unsigned long   Direction;
```

```
        unsigned long   Timestamp;


        // read all the 'parts' from the file
        // [Tried using a structure but always read the wrong size??]
        if(fread(&LenChan, sizeof(unsigned short), 1, hInFile) != 1)
        {
                mdfReadError("CAS LenChan");
        }

        if(fread(&Label, sizeof(unsigned long), 1, hInFile) != 1)
        {
                mdfReadError("CAS Label");
        }

        if(fread(&PreCode, sizeof(unsigned char), 1, hInFile) != 1)
        {
                mdfReadError("CAS PreCode");
        }

        if(fread(&PostCode, sizeof(unsigned char), 1, hInFile) != 1)
        {
                mdfReadError("CAS PostCode");
        }

        if(fread(&Direction, sizeof(unsigned long), 1, hInFile) != 1)
        {
                mdfReadError("CAS Direction");
        }

        if(fread(&Timestamp, sizeof(unsigned long), 1, hInFile) != 1)
        {
                mdfReadError("CAS Timestamp");
        }

        // Timeslot is in Most Significant 5 bits
        fprintf(hOutFile, "%02d  ", (LenChan & 0xF800) >> 11);

        fprintf(hOutFile, "%s", ((Direction & 0x00020000) >> 17) ? " " : "        ");
        fprintf(hOutFile, "%s", mdfLsNibble2Bin(PostCode));

        fprintf(hOutFile, "\n");
}

void mdfProcessR2mf(void)
{
        unsigned short  LenChan;
        unsigned char   Trunk;
        unsigned char   Channel;
        unsigned char   ToneID;


        if(fread(&LenChan, sizeof(unsigned short), 1, hInFile) != 1)
        {
                mdfReadError("R2MF LenChan");
        }

        if(fread(&Trunk, sizeof(unsigned char), 1, hInFile) != 1)
        {
                mdfReadError("R2MF Trunk");
        }

        if(fread(&Channel, sizeof(unsigned char), 1, hInFile) != 1)
        {
                mdfReadError("R2MF Channel");
        }
```

```
        if(fread(&ToneID, sizeof(unsigned char), 1, hInFile) != 1)
        {
                mdfReadError("R2MF ToneID");
        }

        // Timeslot is in Most Significant 5 bits
        fprintf(hOutFile, "%02d  ", (LenChan & 0xF800) >> 11);

        fprintf(hOutFile, "%s", ((ToneID & 0x80) >> 7) ? "               " : "
");
        fprintf(hOutFile, "%2d", ToneID & 0x7F);

//      fprintf(hOutFile, "%s%2d%s",
//                              ((ToneID & 0x80) >> 7) ? "               " : "
",
//                              ToneID & 0x7F,
//                              ((ToneID & 0x80) >> 7) ? "         " : "    ");
//      fprintf(hOutFile, "%s", mdfByte2Bin(ToneID));

        fprintf(hOutFile, "\n");
}

void mdfProcessToneOn(void)
{
        unsigned short  LenChan;
        unsigned long   EvtLabel;
        unsigned long   SigId;
        unsigned char   SigLabel[4];
        unsigned char   LabelSize;
        unsigned char   RepCount;
        unsigned short  Freq1;
        unsigned short  Freq2;
        unsigned long   OnTime;
        unsigned long   OffTime;


        if(fread(&LenChan, sizeof(unsigned short), 1, hInFile) != 1)
        {
                mdfReadError("ToneOn LenChan");
        }

        if(fread(&EvtLabel, sizeof(unsigned long), 1, hInFile) != 1)
        {
                mdfReadError("ToneOn EvtLabel");
        }

        if(fread(&SigId, sizeof(unsigned long), 1, hInFile) != 1)
        {
                mdfReadError("ToneOn SigId");
        }

        if(fread(&SigLabel[4], sizeof(unsigned char[4]), 1, hInFile) != 1)
        {
                mdfReadError("ToneOn SigLabel");
        }

        if(fread(&LabelSize, sizeof(unsigned char), 1, hInFile) != 1)
        {
                mdfReadError("ToneOn LabelSize");
                return;
        }

        if(fread(&RepCount, sizeof(unsigned char), 1, hInFile) != 1)
        {
                mdfReadError("ToneOn RepCount");
        }
```

```
        if(fread(&Freq1, sizeof(unsigned short), 1, hInFile) != 1)
        {
                mdfReadError("ToneOn Freq1");
        }

        if(fread(&Freq2, sizeof(unsigned short), 1, hInFile) != 1)
        {
                mdfReadError("ToneOn Freq2");
        }

        if(fread(&OnTime, sizeof(unsigned long), 1, hInFile) != 1)
        {
                mdfReadError("ToneOn OnTime");
        }

        if(fread(&OffTime, sizeof(unsigned long), 1, hInFile) != 1)
{
                mdfReadError("ToneOn OffTime");
        }

        // Timeslot is in Most Significant 5 bits
        fprintf(hOutFile, "%02d  ", (LenChan & 0xF800) >> 11);
        fprintf(hOutFile, "SIG_ON ");

//      fprintf(hOutFile, " EvtLabel:0x%x", EvtLabel);
        fprintf(hOutFile, " SigId:0x%08x", SigId);
//      fprintf(hOutFile, " SigLabel[1]:0x%02x", SigLabel[1]);
//      fprintf(hOutFile, " SigLabel[2]:0x%02x", SigLabel[2]);
//      fprintf(hOutFile, " SigLabel[3]:0x%02x", SigLabel[3]);
//      fprintf(hOutFile, " SigLabel[4]:0x%02x", SigLabel[4]);
        fprintf(hOutFile, " SigLabel:0x%02x%02x%02x%02x", SigLabel[1], SigLabel[2], SigLabel[3],
SigLabel[4]);
        fprintf(hOutFile, " LabelSize:%u", LabelSize);
        fprintf(hOutFile, " RepCount:%u", RepCount);
        fprintf(hOutFile, " Freq1:%uHz", Freq1);
        fprintf(hOutFile, " Freq2:%uHz", Freq2);
        fprintf(hOutFile, " OnTime:%umSec", OnTime * 10);
        fprintf(hOutFile, " OffTime:%umSec", OffTime * 10);

        fprintf(hOutFile, "\n");
}

void mdfProcessToneOff(void)
{
        unsigned short  LenChan;
        unsigned long   EvtLabel;
        unsigned long   SigId;
        unsigned char   SigLabel[4];
        unsigned char   LabelSize;


        if(fread(&LenChan, sizeof(unsigned short), 1, hInFile) != 1)
        {
                mdfReadError("ToneOff LenChan");
        }

        if(fread(&EvtLabel, sizeof(unsigned long), 1, hInFile) != 1)
        {
                mdfReadError("ToneOff EvtLabel");
        }

        if(fread(&SigId, sizeof(unsigned long), 1, hInFile) != 1)
        {
                mdfReadError("ToneOff SigId");
        }

        if(fread(&SigLabel[4], sizeof(unsigned char[4]), 1, hInFile) != 1)
```

```
        {
                mdfReadError("ToneOff SigLabel");
        }

        if(fread(&LabelSize, sizeof(unsigned char), 1, hInFile) != 1)
        {
                mdfReadError("ToneOff LabelSize");
        }

        // Timeslot is in Most Significant 5 bits
        fprintf(hOutFile, "%02d  ", (LenChan & 0xF800) >> 11);
        fprintf(hOutFile, "SIG_OFF");
//      fprintf(hOutFile, " EvtLabel:0x%x", EvtLabel);
        fprintf(hOutFile, " SigId:0x%08x", SigId);
//      fprintf(hOutFile, " SigLabel[1]:0x%02x", SigLabel[1]);
//      fprintf(hOutFile, " SigLabel[2]:0x%02x", SigLabel[2]);
//      fprintf(hOutFile, " SigLabel[3]:0x%02x", SigLabel[3]);
//      fprintf(hOutFile, " SigLabel[4]:0x%02x", SigLabel[4]);
        fprintf(hOutFile, " SigLabel:0x%02x%02x%02x%02x", SigLabel[1], SigLabel[2], SigLabel[3],
SigLabel[4]);
        fprintf(hOutFile, " LabelSize:%u", LabelSize);
        fprintf(hOutFile, "\n");
}

void mdfProcessTimestamp(void)
{
        unsigned long   iTicks;
        unsigned long   iTemp;
        unsigned long   iHours;
        unsigned long   iMins;
        unsigned long   iSecs;
        unsigned long   imSecs;


        // get timestamp
        if(fread(&iTicks, sizeof(unsigned long), 1, hInFile) != 1)
        {
                mdfReadError("ProcessTimestamp iTicks");
        }

        // convert ticks to mSecs
        iTemp = 4 * iTicks;

        // get the 'odd' mSecs
        imSecs = iTemp % 1000;

        // reduce to Secs
        iTemp = iTemp / 1000;

        // get the 'odd' Secs
        iSecs = iTemp % 60;

        // reduce to Mins
        iTemp = iTemp / 60;

        // get the 'odd' Mins
        iMins = iTemp % 60;

        // get the Hours
        iHours = iTemp / 60;

        fprintf(hOutFile, "%2d:%02d:%02d.%03d  ",
                                        iHours,
                                        iMins,
                                        iSecs,
                                        imSecs);
}
```

```
char* mdfLsNibble2Bin(unsigned char Code)
{
        static char sTemp[5];

        sTemp[0] = ((Code & 0x08) >> 3) ? '1' : '0';
        sTemp[1] = ((Code & 0x04) >> 2) ? '1' : '0';
        sTemp[2] = ((Code & 0x02) >> 1) ? '1' : '0';
        sTemp[3] = (Code & 0x01) ? '1' : '0';
        sTemp[4] = '\0';

        return sTemp;
}

char* mdfMsNibble2Bin(unsigned char Code)
{
        static char sTemp[5];

        sTemp[0] = ((Code & 0x80) >> 3) ? '1' : '0';
        sTemp[1] = ((Code & 0x40) >> 2) ? '1' : '0';
        sTemp[2] = ((Code & 0x20) >> 1) ? '1' : '0';
        sTemp[3] = (Code & 0x10) ? '1' : '0';
        sTemp[4] = '\0';

        return sTemp;
}

char* mdfByte2Bin(unsigned char Code)
{
        static char sTemp[10];

        sTemp[0] = ((Code & 0x80) >> 7) ? '1' : '0';
        sTemp[1] = ((Code & 0x40) >> 6) ? '1' : '0';
        sTemp[2] = ((Code & 0x20) >> 5) ? '1' : '0';
        sTemp[3] = ((Code & 0x10) >> 4) ? '1' : '0';
        sTemp[4] = ' ';
        sTemp[5] = ((Code & 0x08) >> 3) ? '1' : '0';
        sTemp[6] = ((Code & 0x04) >> 2) ? '1' : '0';
        sTemp[7] = ((Code & 0x02) >> 1) ? '1' : '0';
        sTemp[8] = (Code & 0x01) ? '1' : '0';
        sTemp[9] = '\0';

        return sTemp;
}

void mdfReadError(char* szMsg)
{
        printf("\n%s - ", szMsg);
        fprintf(hOutFile, "\n%s - ", szMsg);

        if(feof(hInFile))
        {
                printf("EOF Reached\n");
                fprintf(hOutFile, "EOF Reached\n");
        }
        else if(ferror(hInFile))
        {
                printf("Read Error\n");
                fprintf(hOutFile, "Read Error\n");
        }
        fclose(hOutFile);
        fclose(hInFile);

        exit(0);
}
```

18.6 Sample Parser Output

Following is sample parser output from one complete CAS call (this does not apply to ISDN).

```
# Timestamp  Chan TxABCD RxABCD TxR2 RxR2      Sequence No. 1 #
 0:09:14.124  01   1001
 0:09:14.220  01   0001
 0:09:14.400  01          1101
 0:09:14.508  01                 10
 0:09:14.632  01                       1
 0:09:14.692  01                  1
 0:09:14.812  01                       1
 0:09:14.872  01                  7
 0:09:14.996  01                       1
 0:09:15.056  01                  7
 0:09:15.176  01                       5
 0:09:15.236  01                  1
 0:09:15.360  01                       5
 0:09:15.420  01                 10
 0:09:15.604  01                       5
 0:09:15.604  01                  1
 0:09:15.784  01                       5
 0:09:15.784  01                  8
 0:09:15.908  01                       5
 0:09:15.968  01                  8
 0:09:16.088  01                       5
 0:09:16.148  01                 10
 0:09:16.272  01                       5
 0:09:16.332  01                  1
 0:09:16.452  01                       5
 0:09:16.512  01                 10
 0:09:16.636  01                       5
 0:09:16.696  01                  1
 0:09:16.816  01                       5
 0:09:16.880  01                 15
 0:09:22.104  01                       3
 0:09:22.284  01                  1
 0:09:22.408  01                       6
 0:09:22.512  01          0101
 0:09:27.724  01   1001
 0:09:27.952  01          1101
 0:09:28.192  01          1001
 0:09:28.240  01   1001
```

Getver Reference 19

This chapter provides reference information about the getver tool.

- Description. 103
- Options. 103
- Output 104

19.1 Description

The getver (Get Version) software application outputs version information for files that are part of the Intel® Telecom software installation. You specify the file for which you want the version. For example, the following command prints the version string of the *ssp.mlm* file to the screen:

```
getver ssp.mlm
```

Using getver, you can get version information for the following files provided that they follow supported versioning formats:

- Intel NetStructure® DM3 architecture board firmware files: **.srec*, **.mlm*
- Intel NetStructure DM3 architecture board files: **.hot*, **.psi*
- Windows* Dynamic Load Library files: **.dll*
- Linux* Dynamic Load Library files: **.so*
- Other files part of the Intel Telecom software that follow supported versioning formats (the OA&M executable binaries and libraries have a version that getver can display)

Getver is located in the *bin* directory:

- Windows: *%INTEL_DIALOGIC_DIR%\bin*
- Linux: *${INTEL_DIALOGIC_DIR}/bin*

19.2 Options

This section provides the command line arguments for getver:

```
getver -? <filename> -s -CPU <argument value>
```

Note the following:

- If you are using switches or options, you must use the sequence given above.
- `-?` is a option argument that prints out usage information
- `-s` acts as a switch for processing *srec* files, to be used only if the *srec* file does not end with the *.srec* extension.

- `-CPU` is a case-sensitive option argument to be used for *srec* files only if `getver <filename>` fails. Some possible values are PPC, ONYX, and C6X.

Note: You must specify the path to the file if you do not execute getver from the directory in which the file is located (in this case, the *data* directory).

19.3 Output

Getver will print the version string of the specified file to the screen unless it encounters an unknown versioning format. In such a case, getver will print the following message to the screen:

```
Version format not recognized - file not processed
```

Here are some examples of output:

- Expected output for new “DLcid” versioning format:
  ```
  Version: <The version number string following "DLcid">
  ```
- Expected Output for old “DLcid” versioning format
  ```
  Embedded name: <embedded name>
  Version: <version number> Build <build number>
  ```
- Expected output for Windows versioning format:
  ```
  Version: <version number>
  ```

ISDN Trace Reference 20

This chapter provides reference information about the ISDNtrace tool.The following topics are included:

- Description. 105
- Guidelines 105
- Options. 105

20.1 Description

The ISDNtrace tool provides the ability to track Layer 3 (Q.931) messages on the ISDN D-channel. ISDNtrace prints messages on the screen in real time. This trace information can also be captured into a file.

20.2 Guidelines

The ISDNtrace tool consumes a portion of the CPU for each trunk that is logged and may generate an exception if CTRL-C is used to exit the tool. An exception may also be generated if you use an invalid parameter in the command.

20.3 Options

Options

The ISDNtrace tool uses the following command line options:

-b<n>

Logical ID of board (required).Use the listboards utility (Linux) or the Configuration Manager (DCM) (Windows) to obtain the board's logical ID.

Note: The listboards utility is described in the *Administration Guide* for the release and the Configuration Manager is described in the *Configuration Guides* for the (Windows) release.

-d<n>

The D-channel number (trunk number) on the specified board (required). The default value is 1.

-f<file>

Output file name (required to save output in a file).

Note: A space is used after the `-f` option but not after `-b` or `-d` options.

The following example runs the ISDNtrace tool on board 0, D-channel 1 and prints the output to a *trace.txt* file:

```
isdntrace -b0 -d1 -f trace.txt
```

Intel Telecom Subsystem Summary Tool Reference 21

This chapter describes the Intel® Telecom Subsystem Summary Tool (its_sysinfo) and the information it collects. This chapter contains the following information about its_sysinfo:

- Description 107
- Command Line Interface 107
- Graphical User Interface (Windows only) 108
- Information Collected by its_sysinfo 108
- System Information Data Structuring 110

21.1 Description

The Intel Telecom Subsystem Summary Tool (its_sysinfo) provides a simple way to collect information about systems built using Intel® telecom products. The its_sysinfo tool collects data from the system on which you execute it and provides you with information about the system environment: the operating system, computer architecture, Intel® Dialogic® System Release software, and operational logs.

The its_sysinfo tool also enables you to collect baseline information about the system for quick review of configuration issues when determining system configuration consistency. This information is collected in a file, compressed, and archived as part of the complete system information collection in an archive file named *its_sysinfo.zip* (or a name you specify). If the installed system is configured in such a way that the baseline information is not available, the its_sysinfo tool will indicate “No Information Available.”

In addition to the standard information captured by the its_sysinfo tool, you can manually add files to the archive that is created by *its_sysinfo.exe* after you run the tool so you can preserve additional information that might help with resolving issues.

Procedures for using this tool can be found in the following sections:

- Section 7.2, “Collecting System Data to Diagnose an Application Failure or Crash”, on page 44
- Section 7.3, “Creating a System Configuration Archive”, on page 44

21.2 Command Line Interface

On the command line, enter `its_sysinfo filename` where *filename* is the name you want to give the zip file (it can be the complete path). The its_sysinfo tool will collect system information

and compress it into the zip file. If you do not specify any filename, then the information gets compressed in a zip file with the default name *its_sysinfo.zip*.

21.3 Graphical User Interface (Windows only)

On a Windows system, you can use a GUI to run its_sysinfo as follows:

1. Click on *its_sysinfo.exe* in `%INTEL_DIALOGIC_DIR%\bin`.
2. Click the **Generate** button. A dialog box appears on which you must name the archive file into which you want the information to be collected. The default filename is *its_sysinfo.zip*.
3. Click the **Save** button and its_sysinfo will start collecting information.
4. A pop-up window displaying “Data collection completed. Zip archive was created as <zip file name>” will appear to indicate completion of *its_sysinfo.exe* execution. Click the **OK** button. The archive file is in the location specified in the tool.

21.4 Information Collected by its_sysinfo

The following information is collected under *its_sysinfo.htm*, which is one of the files that is added to the archive:

- **General System Information**
  - **Environment Variables** – information about the operating system environment variables
  - **System Event Logs** – See **Table 3**.
  - **Memory and Processor** – information about the platform’s available and used memory and CPU type and number as of the time you executed the its_sysinfo tool
  - **Operating System** – information about the operating system’s version, service pack, and language
  - **/proc/meminfo file** – Linux only
- **Information Specific to Intel Telecom Products**
  - **Installed Devices** – its_sysinfo collects information about devices detected in Intel Telecom Subsystem configurations and startup.
  - **Configuration Settings for Installed Devices** – its_sysinfo captures the stored values used by the configuration tool for Intel Telecom Subsystem configurations and startup. For more information about the configuration tool, refer to the configuration guide(s) for the system release.
  - **Firmware Files and Versions** – its_sysinfo collects information about the files listing all firmware file names and version numbers.
  - **FCD Files** – its_sysinfo collects information about the *.fcd* files used by the configuration tool for Intel Telecom Subsystem configurations and startup. For more information about FCD files, refer to the configuration guide(s) for the system release.
  - **PCD Files** – its_sysinfo collected information for the *.pcd* file used by the configuration tool for Intel Telecom Subsystem configurations and startup. For more information about PCD files, refer to the configuration guide(s) for the system release.
  - **CONFIG Files** – its_sysinfo collects information about the *.config* file used by the configuration tool for Intel Telecom Subsystem configurations and startup. For more

information about CONFIG files, refer to the configuration guide(s) for the system release.

– **Global Call Configuration** – its_sysinfo collects information about the Global Call PDK subsystem configuration, which is contained in the *pdk.cfg* file. This file specifies the Global Call protocol modules and the country dependent parameter settings downloaded to each device. For more information about Global Call Configuration, refer to the *Global Call Country Dependent Parameters (CDP) Configuration Guide*, which can be found on this website: *http://resource.intel.com/telecom/support/releases/protocols/index.htm.*

– **Build Information** – its_sysinfo collects information about the contents of the buildinfo.ini file used for the installed Intel Telecom Software Subsystem. The *buildinfo.ini* file contains information about what is in the build of the software.

– **Board Memory Dumps**

– **Intel Telecom Subsystem Event Viewer Data** – its_sysinfo collects information about the last events reported to the operating system and to the event logger from the Intel Telecom Subsystem.

– **File Versions**

The its_sysinfo tool also checks for the log files listed in Table 3 and adds them to the archive.

Note: It is possible to specify a name for some log files. However, its_sysinfo only collects files with default names.

Table 3. Log Files Archived by its_sysinfo

Log Files	Windows	Linux
OA& M Files	$(SystemRoot)\System32\anm_debug.log $(SystemRoot)\System32\anm_trace.log %INTEL_DIALOGIC_DIR%\log\ClusterPkg.log %INTEL_DIALOGIC_DIR%\log\ClusterPkg.log.0 Or $(SystemRoot)\System32\ClusterPkg.log* $(SystemRoot)\System32\confslot.log %INTEL_DIALOGIC_DIR%\log\ctbb*.log Or $(SystemRoot)\System32\ctbb*.log dlgcInstall.log is in $(TEMP) %INTEL_DIALOGIC_DIR%\log\dlgcsyslogger.log %INTEL_DIALOGIC_DIR%\log\DM3AutoDump.log $(SystemRoot)\System32\dm3bsp.log $(SystemRoot)\System32\dm3fdspdll.log $(SystemRoot)\System32\frustatus.log %INTEL_DIALOGIC_DIR%\log\GenLoad.log %INTEL_DIALOGIC_DIR%\log\merc.log Or $(SystemRoot)\System32\merc.log %INTEL_DIALOGIC_DIR%\log\ncm.ini %INTEL_DIALOGIC_DIR%\log\oam.log %INTEL_DIALOGIC_DIR%\log\Sctsassi.log	$(INTEL_DIALOGIC_DIR)/log/board*.log $(INTEL_DIALOGIC_DIR)/log/clusterpkg.log $(INTEL_DIALOGIC_DIR)/log/clusterpkg.log.* $(INTEL_DIALOGIC_DIR)/log/dlgsyslogger.log $(INTEL_DIALOGIC_DIR)/log/genload.log $(INTEL_DIALOGIC_DIR)/log/iptconf.log $(INTEL_DIALOGIC_DIR)/log/oam.log
Demos	%INTEL_DIALOGIC_DIR%\log\rgademo.log %INTEL_DIALOGIC_DIR%\log\Board[#].log	$(INTEL_DIALOGIC_DIR)/log/rgademo.log $(INTEL_DIALOGIC_DIR)/log/Board[#].log $(INTEL_DIALOGIC_DIR)/log/dlgrhdemo.log

Table 3. Log Files Archived by its_sysinfo (Continued)

Log Files	Windows	Linux
RTF log Files	<Logfile path>/rtflog*.txt <Logfile path> found in $(INTEL_DIALOGIC_DIR)\cfg\RtfConfigwin.xml or $(DLCFGPATH)\rtfconfig.xml	<Logfile path>/rtflog*.txt <Logfile path> specified in $(INTEL_DIALOGIC_DIR)/cfg/RtfConfigLinux.xml
	<Logfile path>/rtflog.txt <Logfile path> specified in $(DLCFGPATH)\rtfconfig.xml	<Logfile path>/rtflog*.txt <Logfile path> specified in $(DLGCFGPATH)/RtfConfigLinux.xml
CASTrace log Files	$(INTEL_DIALOGIC_DIR)\log\CAStrace.log	$(INTEL_DIALOGIC_DIR)/log/CAStrace.log.*
Debug Angel Files	$(INTEL_DIALOGIC_DIR)\bin\DebugAngel.log	$(INTEL_DIALOGIC_DIR)/log/debugangel.*
Pstndiag Trace log Files	$(INTEL_DIALOGIC_DIR)\log\pstndiag.*	$(INTEL_DIALOGIC_DIR)/log/pstndiag.*
IP Protocol Files	$(SystemRoot)\System32\gc_h3r.log Or $(INTEL_DIALOGIC_DIR)\bin\gc_h3r.log $(SystemRoot)\System32\rtvsp1.log Or $(INTEL_DIALOGIC_DIR)\bin\rtvsp1.log $(SystemRoot)\System32\sdplog.txt Or $(INTEL_DIALOGIC_DIR)\bin\sdplog.txt $(SystemRoot)\System32\siplog.txt Or $(INTEL_DIALOGIC_DIR)\bin\siplog.txt **Note:** This is obsolete. IP protocols supports RTF.	$(HOME)/g*.log $(HOME)/rtvsp1.log **Note:** This is obsolete. IP protocols supports RTF.
Dr. Watson Dump and Log Files	$(USERPROFILE)\Local Settings\Application Data\Microsoft\Dr Watson\DrWtsn32.log	
Its_sysinfo logfile files…	its_sysinfo.log	its_sysinfo.log

Notes: ***1.*** Windows: INTEL_DIALOGIC_DIR=C:\Program Files\Dialogic and SystemRoot=C:\WINNT

2. Linux: INTEL_DIALOGIC_DIR=/usr/dialogic/ and HOME=/root

21.5 System Information Data Structuring

Data collected by its_sysinfo will be available as a single compressed file that contains the following:

- A master data file in HTML format.

- 0 or more files as attachments. The HTML file will contain links and explanations of the attachments.
- An application operation log file generated the during data collecting process.
- The operation log files and attachments will be put in the compressed zip file.

KernelVer Reference 22

This chapter provides reference information about the kernelver tool. The following topics are provided:

- Description. 113
- Options. 113

22.1 Description

The KernelVer tool queries the board's kernel running on a particular processor for its version number. This tool can be used to verify whether or not a processor has crashed.

22.2 Options

The kernelver tool uses the following command line options:

-b<n>
: Logical ID of board (required).Use the listboards utility (Linux) or the Configuration Manager (DCM) (Windows) to obtain the board's logical ID.

  Note: The listboards utility is described in the *Administration Guide* for the release and the Configuration Manager is described in the *Configuration Guides* for the (Windows) release.

--d<level>
: Do not modify. Leave this at the default value of 0.

-f<file>
: Output file name (required to save output in a file).

-p<n>
: Processor number (required). Lowest allowable value is 1.

-l<n>
: Number of times the program will retrieve the version (optional). You can use this option to repeatedly ping the board's kernel to generate message traffic.

-h
: Displays the help screen.

-v
: Displays the version number.

The following example runs the KernelVer tool on board 1, processor 2:

```
kernelver -b1 -p2
```

MercMon Reference 23

This chapter provides reference information about the MercMon tool.The following topics are included:

- Description. 115
- Guidelines 115
- Options. 119

23.1 Description

MercMon provides counter information about DM3 board device drivers (Class Driver and Protocol Drivers). These drivers maintain various counters that can aid in monitoring system activities and interpreting system behaviors.

23.2 Guidelines

The MercMon tool provides counter information about a DM3 board's class driver and protocol driver. The following sections list the types of counters for each driver:

- Class Driver Counters
- Protocol Driver Counters

23.2.1 Class Driver Counters

This section provides details about the class driver counters that are used by the MercMon tool. The class driver counters are as follows:

Note: All counters are on a per board basis except for FailMpathFind and FailStrmFind.

CompleteReads
: returns the size (in bytes) of all the read requests completed by the protocol driver (i.e., the actual size in KB of all the data read from the board)

CompleteSends
: returns the size (in bytes) of all the messages sent to or received from the board

CompleteWrites
: returns the size (in bytes) of all the write requests completed by the Protocol Driver (i.e., the actual size in KB of all the data written to the board)

FailMpathFind
: returns the number of times a request to get a message handle (Mpath) failed (global counter)

FailStrmFind
: returns the number of times a request to get a stream handle failed (global counter)

NumCanTakes
: returns the number of “can takes” received for that board

NumReads
: returns the total number of read requests sent down to the protocol driver

NumSends
: returns the total number of messages sent down to the protocol driver

NumWrites
: returns the total number of write requests sent down to the protocol driver

NumWriteSplit
: returns the number of write requests, which were split for that board

NumOpenedStreams
: returns the number of open streams on that board at any given time

NumCloseStreamErr
: returns the number of stream close requests failed on that particular board

NumOpenStreamErr
: returns the number of stream open requests failed on that particular board

NumStreamClose
: returns the number of stream close requests on that particular board

NumStreamOpen
: returns the number of stream open requests on that particular board

SizeReads
: returns the size (in bytes) of all the messages posted down to the protocol driver

SizeSends
: returns the size (in bytes) of all the messages sent down to the protocol driver

SizeWrites
: returns the size (in bytes) of all the write requests sent down to the protocol driver

TimeoutReads
: returns the number of read requests that timed out

TimeoutSends
: returns the number of messages that timed out while waiting to be sent to the board or awaiting a reply from the board

TimeoutWrites
: returns the number of write requests that timed out

23.2.2 Protocol Driver Counters

This section provides details about the protocol driver counters that are used by the MercMon tool. The protocol driver counters are as follows:

MsgsInPerSramSession
: returns the number of messages read from the SRAM in one session

MsgsOutPerSramSession
returns the number of messages written to the SRAM in one session

NoInDataDPCisr
returns the number of times when we received an interrupt but there was no data transfer between the SRAM and the HOST

StrmsOutPerSramSession
returns the number of streams written to the SRAM in one session (i.e., number of data blocks written)

StrmsInPerSramSession
returns the number of streams read from the SRAM in one session (i.e., the number of data blocks read)

TotalAsyncMsgQDone
returns the number of requests completed in the AsyncMsgQ

TotalBadSramAddr
returns the number of times we tried reading a message/data (streams) from the SRAM but the SRAM address was wrong

TotalBadSramAddrAlloc
returns the number of times the system tried to allocate a data block but the address was wrong

TotalBadSramAddrRelease
returns the number of times the system tried to release a data block but the address was wrong

TotalBadSramDataCount
returns the total number of times we got a data block of size greater than the SRAM_DATA_BLOCK_SIZE

TotalBadSramOffset
returns the number of times we tried reading data (streams) from the SRAM but the offset calculation was incorrect

TotalBadSramOffsetAlloc
returns the number of times we allocated data block but the offset was incorrect

TotalBigMessagesRcvd
returns the number of times we read a “BIG” message from the SRAM (i.e., message size greater than 24 bytes)

TotalBigMessagesSent
returns the number of times we wrote a “BIG” message to the SRAM (i.e., message size greater than 24 bytes)

TotalBogusInterrupts
Not Used

TotalDpcOverruns
returns the total number of DPC overruns (i.e., we were not expecting an interrupt but we got one)

TotalDmaInterrupts
returns the total number of interrupts received from the board for performing DMA

TotalFatSramBlocks
: returns the number of times the system received a “CHAINED” data block (i.e., the data blocks are linked together)

TotalIrpsCancelled
: returns the total number of cancelled requests in any queue

TotalMsgInQ
: returns the number of requests in the Message In Queue, which are awaiting a reply from a board

TotalMsgInQDone
: returns the number of requests completed from the Message In Queue (i.e., requests completed and sent to the application)

TotalMsgInSram
: returns the total number of messages read from the SRAM

TotalMsgOutQDone
: returns the number of requests completed from the Message Out Queue (these requests are sent to the board and then moved to the Message In Queue, if expecting a reply, or completed and sent to the application)

TotalMsgOutSram
: returns the total number of messages written to the SRAM

TotalMsgOverruns
: returns the total number of overruns for the orphan message queue (i.e., we had an orphan message but there was no space in the Orphan Message Queue)

TotalMsgTimeouts
: returns the total number of requests timed out while waiting to be written to the SRAM or awaiting a reply from the SRAM (i.e. either in the Message In Q, Message Out Q or the Async Message Q)

TotalOrphanMsgsv
: returns the total number of Orphan Messages (i.e., messages which were read from the SRAM but do not have any pending requests from the application)

TotalOrphanMsgVolume
: returns the size (in bytes) of the messages present in the Orphan message queue at any given time

TotalOrphanStrms
: returns the total number of Orphan Streams in the Orphan Stream Table (i.e., data which was read from the SRAM but did not have any pending Read Requests from the application)

TotalOrphanStrmMatches
: returns the total number of streams matched in the Orphan Stream table

TotalOrphanStrmVolume
: returns the size (in bytes) of the data present in the Orphan Stream table at any given time

TotalSramDataFull
: returns a count of the number of times the HOST tried to write a stream (data) to the SRAM but the SRAM was full

TotalSramGrantInterrupts
returns the number of "HOST SRAM PENDING" interrupts

TotalSramGrantLost
not used

TotalSramInterrupts
returns the total number of "NORMAL" interrupts received from the board (e.g., there is something to read from the SRAM)

TotalSramMsgFull
returns a count of the number of times the HOST tried to write a message to the SRAM but the SRAM was full

TotalStrmInQ
returns the number of read requests pending in the Stream In Queue

TotalStrmInQDone
returns the number of read requests completed from the Stream In Queue (i.e., read requests completed and sent to the application)

TotalStrmInSram
returns the number of data packets read from the SRAM

TotalStrmOutQ
returns the number of writes performed by the user on that particular board. It is also incremented whenever the application sends an End Of Stream command.

TotalStrmOutQDone
returns the number of Write requests completed from the Stream Out Queue (i.e., Write requests completed and sent to the application)

TotalStrmOutSram
returns the number of data packets written to the SRAM

TotalStrmOverruns
returns the number of Overruns for the Orphan Stream Table (e.g., we had an Orphan Stream but we had exceeded the maximum amount of memory allocated for the Orphan Stream Table or we could not allocate memory.)

TotalStrmTimeouts
returns the total number of Read or Write Requests timed out (from the Stream In Queue or the Stream Out Queue)

TotalUnknownInterrupts
returns the total number of unknown interrupts received from the board

23.3 Options

The MercMon tool uses the following command line options:

/f<file>
log file name (default is *mercmon.log*)

/t<n>
: display timer. The time interval (in milliseconds) between each screen refresh (default is 1000).

/l<n>
: logging interval. The time interval (in seconds) between each log file update (default is 600).

/w
: enable/disable logging to a file (default is enabled)

/?
: displays the help screen

The following example enables logging to the *mercmon.log* file every five minutes and refreshes the screen every two seconds:

```
mercmon /t 2000 /l 300
```

PDK Trace Reference 24

This chapter provides reference information about the PDK Trace tool. The following topics are included:

- Description. 121
- Guidelines 121
- Options. 122
- Sample Scenarios. 122

24.1 Description

The DM3 PDK Protocol Trace (PDK Trace) tool allows those who use a DM3 PDK protocol to log specific information related to the operation of the protocol. The PDK Trace tool is useful for protocol developers because it can trace the runtime states, input signals, output signals, and decision branches of the SDL protocol. The PDK Trace tool allows you to specify which channels on the board to begin tracing. This can be a single channel on one trunk, a single channel on multiple trunks, a range of channels on one trunk, or a range of channels on multiple trunks.

PDK Tracing will work on any of the following products with a PDK protocol loaded: Intel NetStructure® DM/V, DM/V-A, DM/V-B, DM/F, and DMT160TEC boards. PDK tracing is not supported for Intel NetStructure® on DM3 architecture analog boards and Intel NetStructure® DM/IP boards.

Note: If you are using an Intel NetStructure DM/IP board and get the following error message, you can ignore it (the error message appears in DebugAngel - see Chapter 12, “DebugAngel Reference”):

```
001:CP1:Cause-Tag   :  80013, Error File  :qkernerr.h.-Failed to find tracer component address
```

24.2 Guidelines

The PDK Trace tool requires the Global Call Protocols, so you must choose the Global Call Protocols option when you install the Intel® Dialogic® System Release software. Refer to the *Installation Guide* for details.

The PDK Trace tool’s executable name is *pdktrace.exe* for the Windows operating system and *pdktrace* for the Linux operating system. The PDK Trace tool is a command line application that will create a system process thread to interact with the DM3 system to capture trace data. This data will be streamed to a file on the host system.

Upon completion of tracing, the data will be stored on the host system in a file specified when tracing was started (default: *pdktrace.log*). The file is in an unreadable binary format and will need to be converted to a readable format. For help with this, contact technical support (http://resource.intel.com/telecom/support/contact.htm).

24.3 Options

The PDK Trace tool uses the following command line options:

-b#

This **required** option specifies the logical board ID of the board to trace.
Example: `pdktrace -b0` where `0` is the logical board ID of the destination board.

-l[#] or -l[#-#]

Specify which trunk(s) the channels to be traced are located on. The default value is 1 (trunk 1).
Example 1: `pdktrace -b0 -l[1]  /*` Single trunk `*/`
Example 2: `pdktrace -b0 -l[1-4] /*` Range of trunks `*/`

-c[#] or -c[#-#]

Specify which channel(s) on the specified trunks to trace. The default value is 1 (channel 1).
Example 1: `pdktrace -b0 -l[1] -c[5] /*` Single channel `*/`
Example 2: `pdktrace -b0 -l[1-4] -c[1-30] /*` Range of channels `*/`

-f[*filename*]

Specify the name of a file on the host system to write the trace data to. The default is *pdktrace.log*.

-i

This option is **required** only when you **first** use the PDK Trace tool. This option is used to initialize the DM3 Tracer Component in the firmware.

Note: This option should only be used the first time the utility is executed after the board is downloaded

-v

Prints the version number of the utility.

-?, -h

Prints the help screen (command line options) for the utility.

Warning: Due to memory constraints in the embedded DM3 system, the tool will limit the number of channels that can be traced simultaneously to 60. Trying to trace more than 60 channels per board can cause unpredictable results.

24.4 Sample Scenarios

The following are some sample scenarios in which the PDK Trace tool can be used and the command line options used to specify each configuration. These sample scenarios assume that the logical ID of the board being used is 0.

Scenario 1: For board 0, trace channel 1 on trunk 1

```
pdktrace -b0
pdktrace -b0 -l[1]
pdktrace -b0 -l[1] -c[1]
```

Scenario 2: For board 0, trace channels 10-20 on trunk 1

```
pdktrace -b0 -c[10-20]
pdktrace -b0 -l[1] -c[10-20]
```

Scenario 3: For board 0, trace channel 1 on trunks 1-4

```
pdktrace -b0 -l[1-4]
pdktrace -b0 -l[1-4] -c[1]
```

Scenario 4: For board 0, trace channels 1-24 on trunks 1-4

```
pdktrace -b0 -l[1-4] -c[1-24]
```

Note: If any of the above scenarios were being executed on a board for the first time after it was downloaded, the `-i` command line option should also be used as follows:

```
pdktrace -b0 -l[1-4] -c[1-24] -i
```

Phone Reference 25

This chapter provides reference information about the Phone tool. The following topics are included:

- Description. 125
- Guidelines 125
- Options. 125

25.1 Description

The Phone tool uses the TSC and ToneGen instances and requires a TSC component. The Phone tool can control a single DM3 resource channel (make calls, wait for calls etc.), monitor channel and call states, and send call control operations to a DM3 Global Call resource.

25.2 Guidelines

Phone is a QScript utility. For more information about QScript utilities, refer to Chapter 27, "QScript Reference".

When using Dynamic Routing configurations, the audio buttons in tools such as the Phone tool will not work.

25.3 Options

The Phone tool uses the following command line options:

-b<n>
: Logical ID of board (required).Use the listboards utility (Linux) or the Configuration Manager (DCM) (Windows) to obtain the board's logical ID.

  Note: The listboards utility is described in the *Administration Guide* for the release and the Configuration Manager is described in the *Configuration Guides* for the (Windows) release.

-l<n>
: Line number (optional). The default value is 1.

-chan<n>
: Channel number (optional). The default value is 1.

The following example runs the Phone tool on board 1, line 1:

```
phone -b1 -l1
```

PSTN Diagnostics Tool Reference 26

This chapter provides the following reference information about the PSTN Diagnostics tool (pstndiag):

- Description. 127
- Guidelines 128
- Preparing to Run the PSTN Diagnostics Tool 128
- Running the PSTN Diagnostics Tool. 128
- Checking the pstndiag Log File. 135
- PSTN Diagnostics Menus 136
- PSTN Diagnostics Command Line Options 137

For information about how to use the pstndiag tool to perform diagnostic tasks, refer to these chapters:

- Chapter 5, “Diagnosing First Call Issues”
- Chapter 6, “Diagnosing PSTN Protocol Issues”

26.1 Description

The PSTN Diagnostics tool (pstndiag) is a utility for diagnosing and troubleshooting public switched telephone network (PSTN) connectivity problems on specific hardware products based on DM3 architecture.

The pstndiag tool allows you to perform the following activities:

- Query the system for board information
- View all boards in the system that have been downloaded
- Monitor all components (boards, trunks, channels) in the system, and view trunk and channel information, such as trunk status, alarm status, channel state, and call state
- Display the protocol family running on a channel (ISDN or CAS)
- Produce a consolidated log file for all components that are being actively monitored in the system
- Display a previously saved log file
- Launch the ISDNtrace and CAStrace tools to perform further diagnostic tests

26.2 Guidelines

The following restrictions apply to the pstndiag tool:

- The tool is not supported on boards based on Springware architecture.
- It is recommended that you view or monitor no more than 8 channels in your system at one time. Viewing more than 8 channels at one time may negatively impact system performance.
- The pstndiag tool will only identify and list boards with PSTN front-end interfaces. Boards that do not have PSTN front-end interfaces (for example, resource only) will not be presented and cannot be monitored or manipulated by pstndiag.

Pstndiag is a QScript utility. For more information about QScript utilities, refer to Chapter 27, “QScript Reference”.

26.3 Preparing to Run the PSTN Diagnostics Tool

Before running the pstndiag tool, ensure that you have performed the following tasks:

1. The Intel® Dialogic® system release software has been properly installed.
2. The Intel Dialogic system has been started for the boards in your system. The pstndiag tool will detect boards that have already been downloaded.

26.4 Running the PSTN Diagnostics Tool

This section provides instructions for running the pstndiag tool and describes the user interface. The following topics are covered:

- Starting the PSTN Diagnostics Tool
- The Main Window
- The View Bar
- Option Buttons and Command Buttons
- Keyboard Navigation

26.4.1 Starting the PSTN Diagnostics Tool

This section contains instructions for starting the pstndiag tool in Windows and in Linux.

To start the pstndiag tool in **Windows**, follow these instructions:

1. Open a command prompt window. The default location of the tool is *%INTEL_DIALOGIC_DIR%\qscript\tools\pstndiag*. However, you can run the tool from any location.
2. At the command prompt, type:
   `pstndiag`

To start the pstndiag tool in **Linux**, type `pstndiag` from the command line of a `cmd` prompt. No arguments are required because the path is set by the install of the Intel Dialogic System Release software.

Notes: ***1.*** You can specify options at the command line. For more information on these options, see Section 26.7, "PSTN Diagnostics Command Line Options", on page 137.

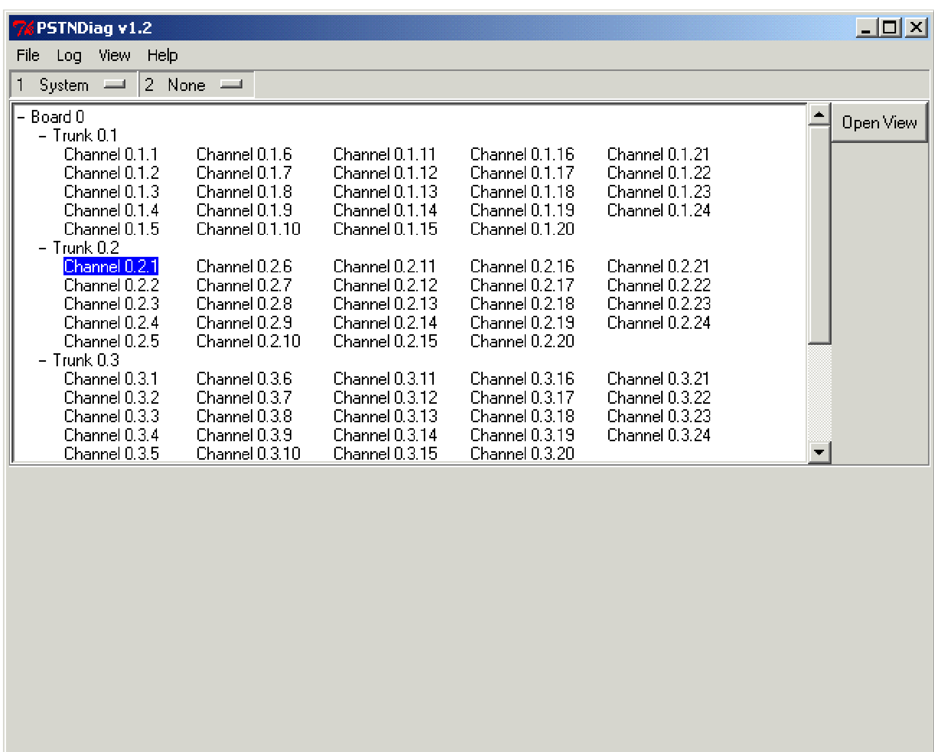
2. If a board is stopped after you have launched the pstndiag tool, you will need to exit from the tool, restart the board, and relaunch the tool to use it again.

26.4.2 The Main Window

After you have launched the pstndiag tool, the **main window** displays a hierarchical tree of all known components in your system. This view is called the **system level view**. The tree consists of three levels: board, trunk, and channel. At the top level, the tree lists all boards that have been downloaded in your system. For each board, all trunks (or spans) are listed. For each trunk, all channels within a trunk are listed. Each of these components (board, trunk, channel) is called a device. The tree can be collapsed or expanded by clicking on the + and - icons.

Figure 7 illustrates a system level view of a DM/V960A-4T1-PCI board.

Figure 7. PSTN Diagnostics Tool - System Level View



The numbering convention, *x.y.z*, is used to identify a component in the tree, for example "**Channel 0.2.1**", where:

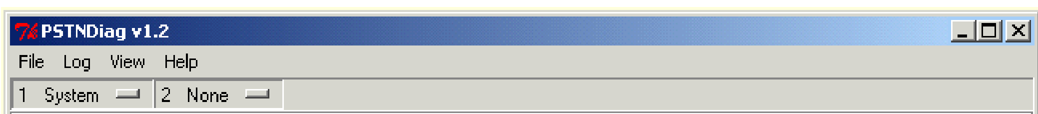
- *x* is an integer that represents the **board** logical ID, in this example **0**
- *y* is an integer that represents the **trunk** on that board, in this example **2**
- *z* is an integer that represents the **channel** number on that trunk, in this example **1**

If only one number is used in the identifier, this number represents the board, such as Board 0 and Board 1. If two numbers are used in the identifier, such as Trunk 0.2 and Trunk 1.5, the first number represents the board and the second number represents the trunk.

26.4.3 The View Bar

The **view bar** contains two option buttons: one (1) represents the upper pane, and the other (2) represents the lower pane. When you first launch the pstndiag tool, the system level view is displayed in the upper pane; the lower pane is empty. The view bar shows these two option buttons: "**1 System**" and "**2 None**". Figure 8 illustrates a sample view bar.

Figure 8. PSTN Diagnostics Tool - View Bar



The label on the option button changes according to what is displayed in that pane. Once a component has been opened, it is then available from both option buttons. To display a component in the upper pane or lower pane, select it from the appropriate option button. To close a view, right-click on the component in the option button and click close view. Alternatively, double-clicking on a component in the system level view displays that component in the upper pane. Shift-double-clicking displays the component in the lower pane.

A view can display a system, a board, a trunk, a channel, or a log file. For example, in a back-to-back test scenario, you might want to display two channel level views at one time. Or you might want to display a board level view and a log file view.

26.4.4 Option Buttons and Command Buttons

Option buttons are buttons that provide additional options. These buttons are identified by a short horizontal bar, as seen in Figure 11 through Figure 18. Click on a button to view additional options, and click on an option to select it. An action occurs, or a new set of parameters is displayed. The use of option buttons allows related information to be grouped together and helps to reduce clutter on the screen.

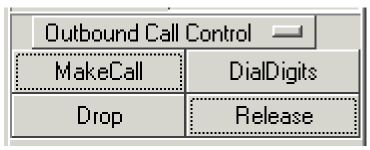
Command buttons are buttons that when pressed activate a command. There are two types of command buttons: those that toggle between two actions (these are identified by two periods following the button name) and those that issue a command directly. For example, the

ResetLineDevice.. button in Figure 9 toggles between setting a channel in service and out of service.

Figure 9. Toggle Command Buttons

Examples of command buttons that issue a command directly are the MakeCall, DialDigits, Drop, and Release buttons in a channel level view shown in Figure 10. Click on a button to issue a command.

Figure 10. Direct Command Buttons



Following is a list of the option buttons. There is a submenu of command buttons under each of the option buttons.

Channel State Commands

The commands under this button are as follows:

SetChanState
: Set a channel in service or out of service

ResetLineDevice
: Drop all calls on the channel and return the call state to Idle

Figure 11. Channel State Command Buttons

Outbound Call Control Commands

The commands under this button are as follows:

MakeCall
: Place an outgoing call

Drop
    Delete a call

DialDigits
    Generate signals for selecting and establishing a connection

Release
    Release the active call on the channel.

Figure 12. Outbound Call Control Command Buttons

Inbound Call Control Commands

The commands under this button are as follows:

AnswerCall
    Answer the call

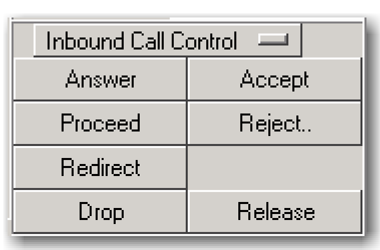
AcceptCall
    Accept the call (this precedes the option of handing off the call to another client or party)

ProceedCall
    Proceed the call (this sends the call proceeding message to the originating side, and waits for Accept (to accept call) or Answer (to answer call) as a subsequent command from the host for further progress of the call). This is available only for ISDN.

RejectCall
    Reject the call

RedirectCall
    Redirect the call elsewhere.

Figure 13. Inbound Call Command Buttons



Call Hold Commands

Note: The following commands are advanced functions for technical support use only.

The commands under this button are as follows:

HoldCall
: Place a call on hold. A call that is on hold is disconnected from the external receive and transmit data streams that are associated with the Telephony Service Channel (TSC) instance. Once the call is on hold, the client is free to establish a new call, either by making an outbound call, or by receiving an inbound call.

RetrieveCall
: Retrieve a call that is on hold, and bring it to the active state. The completion of the Retrieve Call operation is indicated via a Call State event that reports the call state transition to Connected. Note that if there is a call active when the RetrieveCall command is issued, then that call will be placed on hold, so the command can be used to alternate between two calls.

ReconnectCall
: An alternative to the RetrieveCall command, ReconnectCall will retrieve a call that is on hold and make it the active call. The difference is that if a call is active when the command is issued, that call will be dropped rather than put on hold.

Figure 14. Call Hold Command Buttons

Call Transfer Commands

Note: The following commands are advanced functions for technical support use only.

The commands under this button are as follows:

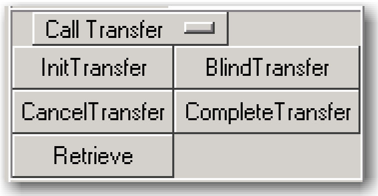
BlindTransfer (single-stage blind-transfer)
: Place the target call on hold, make a consultation call to the destination address, and then hand off the target call to the destination without determining the outcome of the consultation call. The target call's call state will transition first to HoldPendXfer, and then to Idle.

InitTransfer (part of multi-stage transfer)
: Place the target call on hold (HoldPendXfer) and initiate a consultation call to the destination address.

CompleteTransfer (part of multi-stage transfer)
: Transfer the call that was the target of the InitTransfer command to the destination address.

CancelTransfer (part of multi-stage transfer)
: Cancel a supervised transfer by dropping the consultation call and reconnecting to the call that was the target of the transfer operation.

Figure 15. Call Transfer Command Buttons



SendISDN Command

Note: The following command is an advanced function for technical support use only.

The command under this button is as follows:

SendISDN
Sends an arbitrary call-associated Q.931 ISDN Message.

Figure 16. SendISDN Command Button

Misc. Commands

Note: The following commands are advanced functions for technical support use only.

The commands under this button are as follows:

Complete
This command is not currently used.

CancelComplete
This command is not currently used.

Park
This command is not currently used.

Pickup
This command is not currently used.

Figure 17. Misc. Commands Buttons

External Applications

The Audio command is not functional.

Figure 18. External Application Command Button

26.4.5 Keyboard Navigation

You can use the following keyboard keys to navigate through the pstndiag tool:

Up Arrow/Down Arrow
: Scrolls through devices in the tree.

Left Arrow/Right Arrow
: Collapses or expands a level in the tree.

Return or Double-click
: When a component is highlighted, creates a view for this component in the upper pane.

Shift-Return or Shift-Double-click
: When a component is highlighted, creates a view for this component in the lower pane.

Right-click
: When a button in the View bar is highlighted, displays the close view option.

26.5 Checking the pstndiag Log File

This section describes the log file generated by the pstndiag tool.

Logging starts automatically when you launch the pstndiag tool. Logging information is written to the log file for any component (board, trunk, and channel) that is being monitored and opened in a view. The log file is in binary format and must be viewed in the pstndiag tool.

Caution: The diagnostics log file has no maximum size. After completing diagnostics tasks, you should exit the pstndiag tool. Do not run the pstndiag tool indefinitely; otherwise, the resulting log file may consume a large amount of disk space.

The default log file name is *pstndiag.yyyymmdd.hhmmss.pdlog*, where *yyyy* is the year, *mm* is the month, *dd* is the day, *hh* is the hour, *mm* is the minute, and *ss* is the second when the file is created. Each time the tool is run, a new log file is created. Running multiple copies of the tool will result in multiple log files. The log file is written by default to the standard log directory:

- Windows - *%INTEL_DIALOGIC_DIR%/log*
- Linux - *${INTEL_DIALOGIC_DIR}/log*

The log file generated by the pstndiag tool captures all events associated with your use of this tool. There are two types of events: application events (AppEvent) and message events (MsgEvent). The application events are generated as actions occur in the pstndiag tool; for example, line out of service. Message events are messages from the firmware in response to application events or asynchronous events; for example, trunk active. If you run other applications such as demos, only message events are generated. The log file also captures application errors (AppErrors).

A time stamp is provided for each event as it occurs. The event is associated with a board, trunk, or channel. For example, AppEvent(0.2.1) is associated with board 0, trunk 2, and channel 1. The log file also provides a graphical view of each event as it occurs over time.

To display the current log file, select View running log from the Log menu. To view a previously saved log file, select Open log file from the File menu.

26.6 PSTN Diagnostics Menus

This section provides a reference to the menus available in the PSTN Diagnostics or pstndiag tool:

- File menu
- Log menu
- View menu
- Help menu

26.6.1 File menu

The File menu contains the following menu options:

Open log file
: Opens a previously saved log file.

Exit
: Exits the tool.

26.6.2 Log menu

The Log menu contains the following menu options:

View running log
: Displays the current log file in a window.

Logging active
: Enables logging. The default setting is logging enabled. To disable logging, you can use the "-nolog" option at the command line. For information on command line options, see Section 26.7, "PSTN Diagnostics Command Line Options", on page 137.

26.6.3 View menu

The View menu contains the following menu options:

Open system view
: Opens a system level view.

Open new view
: Opens a board, trunk, or channel level view.

26.6.4 Help menu

The Help menu contains the following menu options:

About
: Displays the version number of the pstndiag tool as well as copyright information.

Command line
: Displays information about command line options.

General information
: Displays information about menus, menu options, and views.

26.7 PSTN Diagnostics Command Line Options

Command line options enable you to bypass the system level view and display a specific board, trunk, or channel level view when you start the pstndiag tool.

The following command line options are available:

-b<*b*>
: Starts with a specified board level view, where <*b*> represents the board logical ID.
: **Example**: `-b3` will display the board level view for Board 3 in your system.

-board <*b*>
: Same as -b<*b*>.

-c<*b*>.<*t*>.<*c*>
: Starts with a specified channel level view, where <*b*> represents the board logical ID, where <*t*> represents the trunk (span) on the board, and where <*c*> represents the channel.
: **Example**: `-c3.1.24` will display the channel level view for channel 24 on trunk 1 of board 3.

-chan <*b*>.<*t*>.<*c*>
: Same as -c<*b*>.<*t*>.<*c*>.

-t<*b*>.<*t*>
: Starts with a specified trunk level view, where <*b*> represents the board logical ID and where <*t*> represents the trunk on that board.
: **Example**: `-t3.1` will display the trunk view for trunk 1 of board 3.

-trunk <*b*>.<*t*>
: Same as -t<*b*>.<*t*>.

-help
: Displays help information for the tool.

-logto <*file*>
: Saves log information from open views to the specified file name.

-nolog
: Does not automatically log events for open views.

-noscan
: Does not perform an initial system scan to determine available resources. All views must be opened manually in this mode. Using this option can reduce the time it takes for the tool to start.

-openlog <*file*>
: Starts by displaying the specified log file. The log file extension is *.pdlog* (this file must be viewed in the pstndiag tool). When specifying a directory path, use forward slash.

Example: `-openlog c:/temp/test.pdlog`

QScript Reference 27

This chapter provides information about QScript utilities, which are a subset of the diagnostic utilities.

- Description 139
- File Directories 139
- QScript Environment Variables 140

27.1 Description

The QScript utilities are a subset of the diagnostic utilities. QScript is an object-oriented scripting tool developed for the Intel NetStructure® on DM3 architecture boards.

The following diagnostic utilities use QScript:

- CallInfo
- DigitDetector
- Phone
- PSTN Diagnostics or pstndiag (uses several QScript utilities)

The following administrative utilities, which are documented in the System Release *Administration Guide*, use QScript:

- Line Administration Utility (lineadmin)
- Standard DM3 Configuration Utility (stdconfig)
- TSP Configuration Utility (tspconfig)
- TSP Monitor Utility (tspmon)
- TSP Tracer Utility (tsptrace)

27.2 File Directories

The directory for the Windows batch file used to invoke the QScript tools is:

```
%systemroot%\program files\dialogic\bin
```

The QScript tools developed by Intel are located in:

```
%systemroot%\program files\dialogic\qscript
```

Note: Do not run a <*toolname*>*.qs* file directly. Batch files have been created which call the QScript interpreter to run the <*toolname*>*.qs* file. To use a QScript utility, specify the utility name and parameters on the command line.

27.3 QScript Environment Variables

This section describes the QScript environment variables:

- INTEL_DIALOGIC_QSCRIPT Environment Variable
- Single Session Variable

INTEL_DIALOGIC_QSCRIPT Environment Variable

In a Windows environment, this variable is set during software installation.

Single Session Variable

Set the variable for a single session using the `set` command. To permanently set the environment variable for all login sessions, update the variable in the System Properties Environment tab.

Runtime Trace Facility (RTF) Reference 28

This chapter provides an overview of the Runtime Trace Facility (RTF), including information about editing the RTF configuration file (*RtfConfigLinux.xml* for Linux* and *RtfConfigWin.xml* for Windows*) file to set tracing configuration options. Reference information about the RTF command line options is also included. This chapter contains the following subsections:

- Description. 141
- Installing RTF 142
- RTF Configuration File 142
- Restrictions and Limitations 154
- rtftool Command 156
- Example RTF Configuration Files. 157
- Configuring Remote RTF Logging 160

A procedure for using the tool is provided in Chapter 7, “Debugging Software”.

28.1 Description

RTF provides a mechanism for tracing the execution path of the runtime libraries for the Intel® Dialogic® system release software. All libraries that use RTF write their trace messages to a log file. The resulting log file helps troubleshoot runtime issues for applications that are built with Intel Dialogic system release software.

RTF obtains trace control settings and output formatting from an RTF configuration file (*RtfConfigLinux.xml* for Linux and *RtfConfigWin.xml* for Windows). Each runtime library has several levels of tracing that can be dynamically enabled/disabled by editing the RTF configuration file while your application runs. This allows RTF to be configured to meet specific needs.

Major RTF components include:

- Client library (*librtfmt.dll* for Windows, *librtf.so* for Linux): Dynamic loaded library that provides the software interface to make use of RTF functionality.
- Configuration file (*RtfConfigWin.xml* for Windows, *RtfConfigLinux.xml* for Linux): Editable file that allows you to customize the tracing and output capabilities of RTF (for example, which runtime libraries RTF will trace, the trace levels, location and size of backup log files.)

  Note: You must have administrative rights to modify the *RtfConfig*.xml* files.
- Server application (*RtfServer.exe* for Windows, *RtfServer* for Linux): Service that communicates to all RTF clients, receives trace data from clients, and dispatches data to disk.

- Utility program (*rtftool.exe* for Windows, *rtftool* for Linux): Command line application that allows you to execute RTF functionality from command line or shell scripts.
- Utility program (*RtfTrace.exe*): Command line application that allows you to execute RTF functionality from command line or shell scripts. This is provided for backward compatibility only. All of this utility's functionality is covered in *rtftool.exe*.

28.2 Installing RTF

RTF files are installed as part of the Intel Dialogic system software installation. The RTF configuration file's default installation directory is determined by the INTEL_DIALOGIC_CFG environment variable. Refer to the *Intel Dialogic System Release Software Installation Guide* for information about Intel Dialogic system software environment variables. Because the RTF configuration file's **trace** attribute is set to 1, RTF tracing is enabled by default. Other than editing the RTF configuration file to customize trace settings for your development environment, there are no special configuration steps for starting RTF.

28.3 RTF Configuration File

To make full use of RTF, you will want to modify the RTF configuration file (*RtfConfigLinux.xml* for Linux, *RtfConfigWin.xml* for Windows). This configuration file allows you to define which trace messages will be included in the RTF output. This subsection provides some guidelines for modifying the RTF configuration file and reference information about the file's XML tags and attributes.

Note: You must have administrative rights to modify the *RtfConfig*.xml* files.

The RTF configuration file uses several terms that should be understood before attempting to edit the file. The following definitions should be kept in mind as you edit the RTF configuration file:

module
: a binary file, typically an executable or a shared object library file (.so). An RTF module corresponds to a library or software module that has internal RTF APIs incorporated into its source code.

client
: an entity for identifying a device (e.g. "dxxxB1C1"), component (e.g. "WaveFileSource") or a function (e.g. "**dx_play( )**") that is to be traced by RTF.

label
: an attribute associated with a trace statement (e.g. "Error", "Warning", "Info", "External API entry", "External API exit" etc.). A trace statement's label is used by the trace data output for categorization purposes.

trace entry
: individual entries in the trace data output. The trace data output is typically sent to a file or debug stream.

0
: when a 0 appears next to a configuration item in the RTF configuration file, it indicates that the configuration item is disabled.

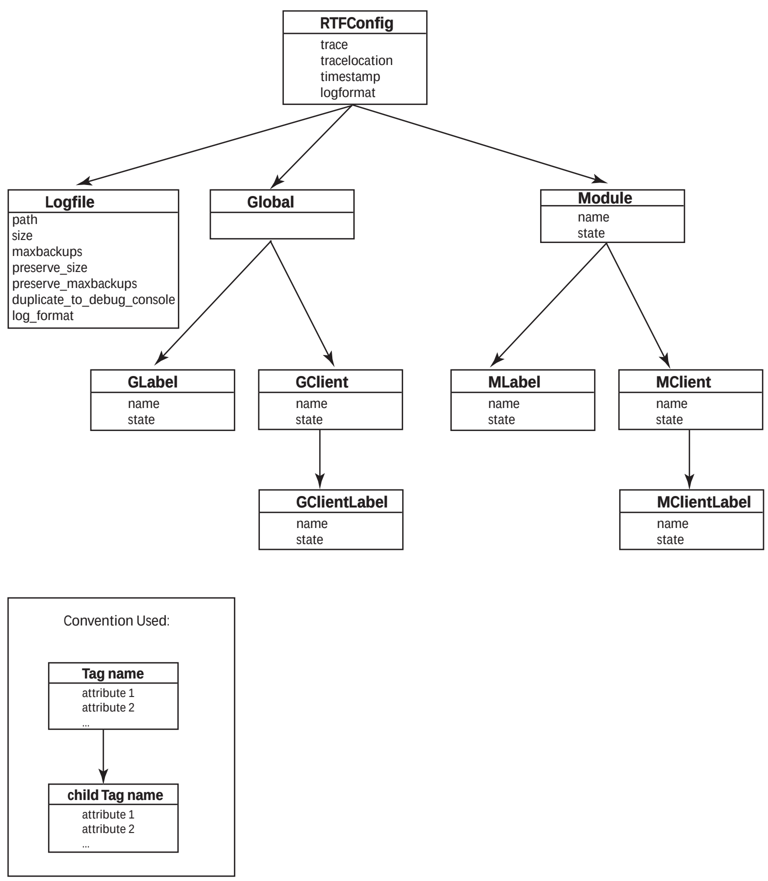
1
: when a 1 appears next to a configuration item in the RTF configuration file, it indicates that the configuration item is enabled.

The RTF configuration file's top-level document tag is the RTFConfig tag. The following three tags are child tags of the RTFConfig tag:

1. Logfile
2. Global
3. Module

Figure 19 shows the XML tag structure and tag attributes of the RTF configuration file:

Figure 19. RTF Configuration File Tag Structure



28.3.1 RTFConfig Tag

RTFConfig is the document tag. This tag is a mandatory component of the RTF configuration file; it can be found at the top of the RTF configuration file. A sample RTFConfig tag entry is shown below:

```
<RTFConfig trace="1" tracelocation="TRACE_LOG" timestamp="1"
logformat="ALIGN">

<!-- Logfile section goes here -->

<!-- Global section goes here -->

<!-- Module sections go here -->

</RTFConfig>
```

The RTFConfig tag includes the following attributes:

trace

This attribute is used to enable or disable the RTF tracing capabilities. Valid values are as follows:

0
: RTF tracing is disabled.

1
: RTF tracing is enabled. This is the default setting.

tracelocation

This attribute has no affect on the file and will be removed in a future release. By default, trace output is sent to a log file.

timestamp

This attribute has no affect and will be removed in a future release. By default, each log file name includes a time stamp.

logformat

This attribute defines the format of the log file. The following two values are supported:

ALIGN
: Aligns the trace entry fields in the log file into comma separated columns. The top of each column includes a header that provides a description of the column's content. This is the default setting.

UNALIGN
: Separates the trace entry fields in the log files with commas. Column alignment is not done.

Notes: ***1.*** If you set the logformat attribute to ALIGN, you can customize the widths of the various columns. The following attributes in the RTF configuration file allow you to define the aligned column widths:

- **ModuleWidth number** - Allows you to customize the number of characters that appear in the Module column. The default setting is 10. There is no maximum setting.
- **ClientWidth number** - Allows you to customize the number of characters that appear in the Client column. The default setting is 15. There is no maximum setting.

– **LabelWidth number** - Allows you to customize the number of characters that appear in the Label column. The default setting is 10.There is no maximum setting.

2. Using the ALIGN setting makes the log file easier to read but it does not make efficient use of hard drive space. This inefficiency is exacerbated as the log file grows. The UNALIGN format is separated by commas so it can be parsed by a spreadsheet or database program to make the file easier to read.

28.3.2 Logfile Tag

The Logfile tag is the first child tag of the RTFConfig tag. The Logfile tag provides logistical information about the log file(s) used to store trace output.

If you would like to customize the appearance and settings of the log file, edit the Logfile tag within the RTF configuration file. The Logfile tag appears under the RTFConfig tag in the RTF configuration file.

A sample Logfile tag entry from the *RtfConfigLinux.xml* file is shown below:

```
<Logfile path=”$(INTEL_DIALOGIC_DIR)/log” size=”300” maxbackups=”10”
preserve_size=”300” preserve_maxbackups=”10”
duplicate_to_debug_console=”0” log_format=”text”/>
```

A sample Logfile tag entry for the *RtfConfigWin.xml* file is shown below:

```
<Logfile path=”$(INTEL_DIALOGIC_DIR)\log” size=”300” maxbackups=”10”
preserve_size=”300” preserve_maxbackups=”10”
duplicate_to_debug_console=”0” log_format=”text”/>
```

The Logfile tag includes the following attributes:

path

Indicates a valid directory path for the log file. The default path for Linux is *$(INTEL_DIALOGIC_DIR)/log*. The default path for Windows is *$(INTEL_DIALOGIC_DIR)\log*. The INTEL_DIALOGIC_DIR environment variable is defined as part of the system release software installation routine. Refer to the *Intel Dialogic System Release Software Installation Guide* for more information about the INTEL_DIALOGIC_DIR environment variable.

size

Sets the maximum size, in Kilobytes (KB), of the log file when RTF is run with preservation mode turned OFF. The default setting is 300. When the file reaches its maximum size, RTF “rolls over” the log file, much like a circular buffer. The previous log file is saved as a timestamped text file. RTF aligns the entries so that the oldest entry is always at the top of the log file and the newest entry is always at the bottom of the log file.

Notes: ***1.*** Due to the internal buffers used by RTF, the actual size of the log file may be up to 1 MB larger than the size attribute's value. For example, if the size attribute is set to 1000 KB, the actual log file may grow up to 2000 KB.

2. This attribute is only applicable when RTF preservation mode is turned OFF. When RTF preservation mode is ON, the preserve_size attribute determines the size of the log file. Refer to Section 28.5.3, "Running RTF in Preservation Mode", on page 156 for information about preservation mode.

maxbackups

Indicates the maximum number of backup log files the RTF creates when the RTF is run with preservation mode turned OFF. If this attribute is set to 0, all trace information is written to one log file. If this attribute is set to 1 or greater, all trace information is initially written to one log file. When the size of this initial log file reaches the threshold defined in the Logfile tag's size attribute, the RTF trace data "rolls over" into a second log file. When the size threshold is reached in the second log file, the RTF trace data "rolls over" into a third log file. This sequence occurs until the number of backup log files created equals the maxbackups attribute setting. When the "roll over" occurs, the previous log file is saved under the following timestamped name:

rtflog-<year><month><day>-<hour>h<minute>m.<second>s.txt

If the number of backup log files exceeds the number defined in maxbackups, the oldest backup file will be deleted and a new one will be created, on a first in, first out basis. The default maxbackups value is 10.

Notes: ***1.*** This attribute is only applicable when RTF preservation mode is turned OFF. When RTF preservation mode is ON, the preserve_maxbackup attribute determines the number of backup log files. Refer to Section 28.5.3, "Running RTF in Preservation Mode", on page 156 for information about preservation mode.

2. There is no limit to the maximum backups imposed by the RTF itself. However, a higher limit will increase the usage of disk space and impact performance since RTF needs to keep track of all backup files and remove old ones as necessary.

preserve_size

Sets the maximum size, in Kilobytes (KB), of the log file when the RTF is run with preservation mode turned ON. The default setting is 300. When the file reaches its maximum size, RTF "rolls over" the log file, much like a circular buffer. The previous log file is saved as a timestamped text file. RTF aligns the entries so that the oldest entry is always at the top of the log file and the newest entry is always at the bottom of the log file.

Note: This attribute is only applicable when RTF preservation mode is turned ON. When RTF preservation mode is OFF, the size attribute determines the size of the log file. Refer to Section 28.5.3, "Running RTF in Preservation Mode", on page 156 for information about preservation mode.

preserve_maxbackups

Indicates the maximum number of backup log files the RTF creates when the RTF is run with preservation mode turned ON. If this attribute is set to 0, all trace information is written to one log file. If this attribute is set to 1 or greater, all trace information is initially written to one log file. When the size of this initial log file reaches the threshold defined in the Logfile tag's preserve_size attribute, the RTF trace data "rolls over" into a second log file. When the size threshold is reached in the second log file, the RTF trace data "rolls over" into a third log file. This sequence occurs until the number of backup log files created equals the preserve_maxbackups attribute setting. When the "roll over" occurs, the previous log file is saved under the following timestamped name:

rtflog-<year><month><day>-<hour>h<minute>m.<second>s_p.txt

Note: The _p suffix appears in the log file name because preservation mode is turned ON.

The default preserve_maxbackups value is 10.

Note: This attribute is only applicable when RTF preservation mode is turned ON. When RTF preservation mode is OFF, the maxbackups attribute determines the number of backup log files. Refer to Section 28.5.3, "Running RTF in Preservation Mode", on page 156 for information about preservation mode.

duplicate_to_debug_console

This attribute determines whether or not trace information is duplicated in the debug console (Windows) or the standard error output (Linux). Possible settings are as follows:

1

The trace output information will be duplicated on the debug console for Windows systems or the standard error output for Linux systems.

0

The trace output information will not be duplicated on the debug console for Windows systems or the standard error output for Linux systems. This is the default setting.

log_format

This attribute determines the format of the output log file. By default, this is set to "text" (the trace output log is written in readable, text file format). However, you can change the attribute to "binary" to get binary output.

28.3.3 Global Tag

The Global tag is the second child tag of the RTFConfig tag. The Global tag is used to specify the global configuration. Global configuration settings are valid for all modules included in the RTF configuration file. However, the Global tag has the lowest priority in the RTF configuration file. Therefore, the global configuration settings can be overridden by individual settings at the Module tag level (see Section 28.3.7, "Module Tag", on page 150).The Global tag cannot occur more than one time in the RTF configuration file. The Global tag can either be empty:

```
<Global>

<!-- This is an example of an empty Global tag -->

</Global>
```

or the Global tag can have GLabel and/or GClient child tags. There are no attributes associated with the Global tag.

28.3.4 GLabel Tag

The GLabel tag is a child tag of the Global tag; it is used to configure global labels. If a label is defined at the GLabel level then all module and client behavior will be governed by this configuration (unless overridden for a given module at the MLabel level).

The following line may appear in the default *RtfConfigLinux.xml* file:

```
<GLabel name = "Error" state = "1"/>
```

This line indicates that tracing of all Error labels is turned on by default. To disable this default behavior, you can delete this line or change the “Error” state attribute setting to 0.

The following lines appear in the default *RtfConfigWin.xml* file:

```
<GLabel name = "Error" state = "1"/>
<GLabel name = "Exception" state = "1"/>
```

These lines indicate that tracing of all Error labels and all Exception labels is turned on by default. To disable this default behavior, you can delete these lines or change the “Error” state attribute and “Exception” state attribute setting to 0.

The GLabel tag has the following two attributes:

name

Indicates the name of the global label to be configured. *You must define the name of the global label*; there is no default value. Examples of possible labels include:

- “Error” (enabled at the Global level by default)
- “Debug”
- “Info”
- “Warning”

Note: Refer to the default RTF configuration file’s `MLabel name` attributes. These default entries are for the Intel Dialogic runtime libraries. Any of these runtime library label names can be included in a GLabel tag.

state

Specifies the state of the label. Valid values are as follows:

1
: Label is enabled at the global level. All trace messages associated with this label will be sent to the trace output. This is the default value.

0
: Label is disabled at the global level. Trace messages associated with this label will not be sent to the trace output.

28.3.5 GClient Tag

The GClient tag is a child tag of the Global tag; it is used to configure global clients (devices). If a client is defined at the GClient level then all client behavior will be governed by this configuration (unless overridden for a given client at the MClient level). The GClient tag can be empty or have GClientLabel children tags. The GClient tag has the following two attributes:

name

Indicates the name of the client to be configured. *You must define the name of the global client*; there is no default value. Examples of possible client names include:

- "dxxxB1C1" (voice device)
- "dxxxB2C2" (voice device)
- "ipmB2C2" (IP media device)

Note: Refer to the *Standard Runtime Library API for Windows Operating Systems Programming Guide* for more information about client names for Intel Dialogic libraries and devices.

state

Specifies the state of the client. Valid values are as follows:

1
: Client is enabled at the global level. All trace messages associated with this client will be sent to the trace output. This is the default value.

0
: Client is disabled at the global level. Trace messages associated with this client will not be sent to the trace output.

28.3.6 GClientLabel Tag

The GClientLabel tag is a child tag of the GClient tag; it is used to specify a label for a global client. The GClientLabel tag has the following two attributes:

name

Indicates the name of a client label to be configured. *You must define the name of the client label*; there is no default value. Examples of possible client labels include:

- “Error”
- “Warning”
- “Entry”

Note: Refer to the default RTF configuration file’s `MLabel name` attributes. These default entries are for the Intel Dialogic runtime libraries. Any of these runtime library label names can be included in a GClientLabel tag.

state

Specifies the state of the label. Valid values are as follows:

1
: Client label is enabled at the global level. Trace messages associated with this label will be sent to the trace output. This is the default value.

0
: client label is disabled at the global level. Trace messages associated with this label will not be sent to the trace output.

28.3.7 Module Tag

This tag is used to specify configuration for various modules. Module tags have a higher priority than global tags so settings at the module level override settings at the global level. For example, if the state of a label “Error” is set to “1” in the global section and “Error” is set to “0” for an individual module, then the label “Error” will not be traced for that particular module. The module section must exist in the configuration file, even if the section is empty. Possible child tags of the Module tag are MClient and MLabel.

The RTF configuration file contains modules for the Intel Dialogic runtime libraries. The following example shows that the module name for the Fax Library is “spwrfax”:

```
<!--  Fax Library   -->
- <Module name="spwrfax" state="1">
  <MLabel name="DEBG" state="0" />
  <MLabel name="INFO" state="0" />
  <MLabel name="APPL" state="0" />
  <MLabel name="WARN" state="0" />
  <MLabel name="ERR1" state="1" />
  <MLabel name="EXCE" state="0" />
  </Module>
```

You can edit the state attributes of the modules to enable (set state = “1”) or disable (set state = “0”) the tracing. Alternatively, you can delete one or more modules from the default RTF configuration file if you are not interested in tracing certain runtime libraries.

Note: The RTF configuration file contains some older sections that have been retained for backward compatibility.

The Module tag includes the following attributes:

name

Indicates the name of a module to be configured. Intel Dialogic runtime libraries have module names in the default RTF configuration file. Example module names in the RTF configuration file include:

- "gc"
- "libsrl"
- "spwrdevmgmt"

state

Specifies the state of the module. Valid values are as follows:

1
: Module is enabled. Trace messages associated with this label will be sent to the trace output. This is the default value.

0
: Module is disabled. Trace messages associated with this label will not be sent to the trace output.

28.3.8 MLabel Tag

The MLabel tag is a child tag of the Module tag. The MLabel tag is used to configure module labels. If a label is defined at the global level and the same label is defined at the module level, the module level configuration overrides the global configuration for the module. The MLabel tag has the following two attributes:

name

Indicates the name of the label to be configured. The Intel Dialogic runtime libraries have module label names in the default RTF configuration file. Example module label names in the RTF configuration file include:

- "APPL"
- "DEBG"
- "WARN"

state

Specifies the state of the label. Valid values are as follows:

1
: Label is enabled. Trace messages associated with this label will be sent to the trace output. This is the default value.

0

Label is disabled. Trace messages associated with this label will not be sent to the trace output.

Note: When the state attribute is not included or not defined, the default value is 1. However, the Intel Dialogic runtime library module labels that exist in the default RTF configuration file have their state attribute initially set to 0.

28.3.9 MClient Tag

The MClient tag is a child tag of the Module tag; it is used to configure a specific client for the module. The MClient tag can be empty or have MClientLabel children tags. The MClient tag has the following two attributes:

name

Indicates the name of the client to be configured. The Intel Dialogic runtime libraries have pre-defined module client names in the default RTF configuration file. Example clients include:

- “dxxxB1C1” (voice device)
- “dxxxB2C2” (voice device)
- “ipmB2C2” (IP media device)

Note: Refer to the *Standard Runtime Library API for Windows Operating Systems Programming Guide* for more information about client names for Intel Dialogic libraries and devices.

state

Specifies the state of the client. Valid values are as follows:

1

Client is enabled. Trace messages associated with this client will be sent to the trace output. This is the default value.

0

Client is disabled. Trace messages associated with this client will not be sent to the trace output.

Note: When the **state** attribute is not included or not defined, the default value is 1.

28.3.10 MClientLabel Tag

The MClientLabel tag is a child tag of the MClient tag; it is used to specify a label for a client. The MClientLabel tag has the following two attributes

name

Indicates the name of a label to be configured. *You must define the name of the label*; there is no default value. Example labels include:

- “APPL”

- "DEBG"
- "WARN"

Note: A complete list of labels for a given library can be found in the RTF configuration file.

state

Specifies the state of the label. Valid values are as follows:

1
: Label is enabled. Trace messages associated with this label will be sent to the trace output. This is the default value.

0
: Label is disabled. Trace messages associated with this label will not be sent to the trace output.

28.3.11 Precedence Scheme for Module/Client Labels

This section summarizes the precedence scheme of settings in RTF module/client labels. Basically, RTF has three types of handles for use in determining if a trace statement will be filtered. They are modules, clients, and labels. A trace statement can use filtering of either of the following:

module+label
: For trace statements that use module+label, the trace will only be stored in a file when both module and label are enabled.

module+client+label.
: For trace statements that use module+client+label, the trace will only be stored in a file when module, client and label are all enabled.

When it is not provided in the configuration file, default enable/disable settings for the three types of handles are:

- Module: disabled.
- Client: enabled.
- Label: disabled.

For handles set in the configuration file, the precedence order is:

- Module: No precedence order since it is only available at a module level. No global level.
- Client: Settings in the module section override settings in the global section.
- Label: For trace statements *without* client handles, settings in the module section override settings in the global section. For trace statements *with* client handles, settings in the module/client section override settings in the client/label section; settings in the client/label section override settings in the module section; and settings in the module section override settings in the global section.

Figure 19 shows the hierarchy of the possible handles and how they relate to one another.

28.4 Restrictions and Limitations

Keep the following restrictions and limitations in mind when using RTF:

- If you run full RTF logging on high-density systems, you may experience I/O throughput degradation. It is recommended that you do not run RTF with full logging on high-density systems or any field-deployed systems. Instead, use just the default error-enabled logging.
- If you install the Intel Dialogic system release software on a FAT32 formatted hard drive, the RTF tool will generate an *Error after install attempting to launch* error message. The error message appears because FAT32 does not support file system access control. However, RTF will continue to function.
- The Intel Dialogic system software installation routine creates a *usr\dialogic\log* directory. When the system software is installed on a Mandriva* (formerly Mandrakesoft) Linux system, the Mandriva security utility (msec), which automatically runs every hour, may reset the access permissions to this *...\log* directory. To avoid the resetting of permissions, you must perform the following before running RTF:
  1. Issue the `echo $SECURE_LEVEL` command. The Mandriva Linux system will return a number that indicates the current system security setting.
  2. Add the following line to the *perm.n* file (located in */usr/share/msec/perm.n*), where *n* indicates the security setting number returned in the previous step:

     ```
     \var\log\dialogic\* current xxx
     ```

     Where xxx indicates the desired access permission setting for the directory.
  3. After you change the *perm.n* file, run

     ```
     msec n
     ```

     so that the change will take effect immediately.
- When RTF logging is enabled, logs are stored in the *$(INTEL_DIALOGIC_DIR)\log* directory. You should take necessary precautions to ensure that the directory never fills.
- Occasionally, errors that appear in the RTF log can be ignored in certain circumstances. Check the “Release Issues” chapter in the *Release Update* for the Intel telecom software you are using (System Release or Host Media Processing [HMP]). Such errors will be listed and explained in the “Release Issues” table.

28.4.1 Guidelines for Editing the RTF Configuration File

Keep the following rules in mind when editing the RTF configuration file:

1. Do not change the name of the file. The filename must remain at its default setting.
2. The RTF configuration file is broken down into four sections. The sequence of the sections must always be as follows:
   a. RTFconfig
   b. Logfile configuration
   c. Global configuration
   d. Module configuration
3. RTF uses the following default log file names:

- *rtflog-<year><month><day>-<hour>h<minute>m.<second>s.txt* when preservation mode is OFF.
- *rtflog-<year><month><day>-<hour>h<minute>m.<second>s_p.txt* when preservation mode is turned ON.

4. The Global configuration section can only appear one time in the RTF configuration file.
5. If a there is configuration information which conflicts in the global and module sections (for example, the global section enables a trace label for a client, but the module section disables this same label for the same client), then the module configuration overrides the global configuration.
6. Configuration information which is repeated later in the file will take precedence. For example, if there are two module configurations for *spwrvoice*, the configuration information lower in the file will dictate tracing behavior for that module.

   Note: This should not be done, but it is mentioned here so the behavior can be recognized if this situation occurs by error.
7. RTF is case sensitive. Therefore, the trace labels "Error" and "error" are considered to be two distinctly different trace labels.
8. Simultaneous tracing of multiple Intel Dialogic libraries may have an adverse effect on system performance.
9. If you run full RTF logging on high-density systems, you may experience I/O throughput degradation (specifically if you enable tracing on the MClient name MUTEX). It is recommended that you do not run RTF with full logging on high-density systems or any field-deployed systems. Contact customer support before enabling extensive logging. Instead, use just the default error-enabled logging.
10. RTF affects running processes/applications only. If you enable RTF prior to starting your application, the RTF will not provide trace information until your application has started.
11. If you wish to dynamically edit the RTF trace levels while your application runs, it is not necessary to stop RTF. Instead, perform the following:
    a. Open the RTF configuration file.
    b. Customize the settings in the RTF configuration file.
    c. Save and close the RTF configuration file.
    d. Issue the `rtftool reload` command to reload RTF configuration file and restart the RTF engine.

    Note: Keep in mind that changes made to the RTF configuration file will not be reflected in the RTF output until the tool has been reloaded.
12. At any time, you can issue the `rtftool` command to pause/restart RTF. RTF will not provide trace output while it is paused. Refer to Section 28.5, "rtftool Command", on page 156 for more information.
13. Save the original *RtfConfigWin.xml* file or *RtfConfigLinux.xml* file, as it is advisable to return to the original logging level when finished using the RTF logging mechanism.

28.5 rtftool Command

This section explains the `rtftool` command, which is used to control RTF and modify the trace output. The `rtftool` command is issued from the command line. The `rtftool` command can be issued from any directory.

28.5.1 Pausing and Reloading RTF

RTF tracing is enabled by default. Use the `rtftool` command to pause, resume and reload the RTF's tracing capabilities. The `rtftool` command has the following pause and reload variations:

`rtftool pause`
: Pauses RTF tracing. Trace output will not be written to the log file while RTF is paused.

`rtftool resume`
: Resumes RTF tracing. Issue this command to resume tracing after RTF has been paused.

`rtftool reload`
: Reloads an updated RTF configuration file (*RtfConfigLinux.xml* or *RtfConfigWin.xml*) and restarts RTF, using the settings from the updated RTF configuration file.

> ***Note:*** You do not need to pause RTF tracing before issuing the `rtftool reload` command. RTF supports dynamic updates to the RTF configuration file. Simply edit and save the file, then issue the `rtftool reload` command to begin tracing with the updated RTF configuration file settings.

28.5.2 Clearing the RTF Trace Log File Contents

Use the `rtftool` command to clear all trace data from the RTF log file. The following command line option clears the RTF log file contents:

`rtftool clean [-f]`
: Clears the RTF log file contents. When the `-f` option is used, RTF will not ask the user for confirmation before clearing the log file.

28.5.3 Running RTF in Preservation Mode

You can set RTF to run in preservation mode. Preservation mode allows you to determine whether old trace data is overwritten or preserved in a separate file when the log file grows to its maximum size. When preservation mode is turned ON, RTF will append a *_p* to the end of each RTF log file name; RTF will not delete or overwrite these *_p* log files. Use the preserve_size and preserve_maxbackup Logfile tag attributes to set the size and number of backup log files, respectively. Use the following command line option to enable/disable preservation mode:

`rtftool preservation {on | off}`
: Turns RTF preservation mode ON and OFF.

28.6 Example RTF Configuration Files

This section provides a number of example *RtfConfig*.xml* files along with a brief explanation of how the file settings affect the RTF trace output. Note that the same rules/examples covered in this section apply to both the *RtfConfigWin.xml* and *RftConfigLinux.xml* file.

28.6.1 Example 1: Tracing disabled - RtfConfigWin.xml

```
<?xml version="1.0" standalone="no"?>


<RTFConfig trace="0" tracelocation="TRACE_LOG" logformat="ALIGN"
timestamp="1">


<Logfile path="$(INTEL_DIALOGIC_DIR)\log" size="1000" maxbackups="2"
preserve_size="300" preserve_max_backups="10"
duplicate_to_debug_console="0" log_format="text"/>

<Global>

</Global>


<Module name="spwrvoice" state = "1">
    MLabel name="ERR1" state = "1"/>
    MLabel name="WARN" state = "0"/>
</Module>


</RTFConfig >
```

Explanation

The RTFConfig tag's trace attribute is set to 0 so tracing is disabled. Trace output will not be created. Set the trace attribute to 1 to activate tracing.

28.6.2 Example 2: Tracing enabled, logfile path and size specified, preservation mode OFF, one module configured - RTFConfigLinux.xml

```
<?xml version="1.0" standalone="no"?>

<RTFConfig trace="1" tracelocation="TRACE_LOG" timestamp="1"
logformat="ALIGN">

<Logfile path="$(INTEL_DIALOGIC_DIR)/log" size="1000" maxbackups="2"
preserve_size="300" preserve_max_backups="10"
duplicate_to_debug_console="0" log_format="text"/>
```

```
<Global>

</Global>

<Module name="spwrvoice" state = "1">
   MLabel name="ERR1" state = "1"/>
   MLabel  name="WARN" state = "1"/>
</Module>

</RTFConfig >
```

Explanation

The RTFConfig tag’s trace attribute is set to 1 so tracing is enabled. The Global tag is empty, so there is no global configuration. For this example, tracing is only configured at the module level.

The path for the log file is *$(INTEL_DIALOGIC_DIR)/log*. Preservation mode is OFF, so the size and maxbackup attributes apply while the preserve_size and preserve_max_backups attributes are ignored. The maximum logfile size is 1000KB. The system maintains a maximum of 2 backup log files.

The only module configured for trace is *spwrvoice*. This means that all clients (devices) for this module are configured to trace ERR1 and WARN labels.

28.6.3 Example 3: Tracing enabled, logfile path and size specified, several modules configured, global configuration used - RTFConfigWin.xml

```
<?xml version="1.0" standalone="no"?>
<RTFConfig trace="1" tracelocation=”TRACE_LOG” logformat=”ALIGN”>

<Logfile path="$(INTEL_DIALOGIC_DIR)\log" size="1000" maxbackups=”2”
preserve_size=”300” preserve_max_backups=”10”
duplicate_to_debug_console=”0” log_format=”text”/>

<Global>
   <GLabel name="Entry" state = "1"/>
   <GClient name="dxxxB1C2" >
      <GClientLabel name="Exit" state =”1”/>
   </GClient>
</Global>



<Module name="spwrvoice" state = "1">
   MLabel name="ERR1" state = "1"/>
   MLabel  name="WARN" state = "0"/>
</Module>
```

```
<Module name="spwrvoice">
   <MLabel name="ERR1" state = "0"/>
   <MLabel  name="WARN" state = "1"/>

   <MClient name="dxxxB1C2" >
      <MClientLabel name="ERR1"/>
   /MClient>
</Module>


<Module name="faxntf" state = "1">
   <MLabel  name="WARN" state = "1"/
</Module>



<Module name="dtintf">
   <MClient name="dxxxB2C1">
      <MClientLabel name="EXCE"/
   </MClient>


</Module>

</RTFConfig >
```

Explanation

The trace attribute of the RTFConfig tag is set to 1 so tracing is enabled.

The logfile path is *$(INTEL_DIALOGIC_DIR)\log*. Preservation mode is ON, so the size and maxbackup attributes are ignored while the preserve_size and preserve_max_backups attributes apply. The maximum logfile size is 300KB. The system maintains a maximum of 10 backup log files (filenames appended with a *_p*).

The Global section is present in the configuration file, so all modules will have this global configuration. This configures “Entry” as a global label and “dxxxB1C2” is a global client for label “Exit”.

In the module section, there are two configurations for *spwrvoice* so the later configuration will take precedence. Since the state of *spwrvoice* is not specified, it takes default value “1”. Tracing is enabled for the module *spwrvoice* but only for the “WARN” label.

The client “dxxxB1C2” is also configured to trace in the *spwrvoice* module with the label “ERR1”. Therefore the client “dxxxB1C2” in *spwrvoice* is traced for the label “ERR1”, even though it is disabled in the module section. While all other clients of *spwrvoice* are configured to be traced for only label “WARN”, as “WARN” is the only label configured to be traced for the module.

The *faxntf* module is configured to trace “WARN” (from the module section) and “Entry” (from the global section).

The *dtintf* module is configured to trace "Entry" (from the global section). "dxxxB1C2" in *dtintf* is configured to trace "Entry" (from the global section) and "Exit" (from the global client). The other client "dxxxB2C1" is configured to trace "Entry" (from the global configuration) and "EXCE" (from the module client section). All other clients of this module are configured to trace "Entry" (from the global section) since these labels are configured for the module.

28.7 Configuring Remote RTF Logging

This section contains the following information:

- Introduction
- Configuring the Client System
- Configuring the Server System
- Cautions
- Disabling Remote Logging

28.7.1 Introduction

RTF servers can be configured to communicate with each other. This provides remote tracing capability. A trace produced on one machine can be re-directed and stored on another machine on the network. This section describes how to configure remote RTF logging.

The terminology used to describe remote RTF logging is as follows:

Client (remote) system
: A system that contains System Release software and telephony boards and is running the end-user telephony application.

Server (management/help desk system)
: A system that contains the System Release software and will be used to collect RTF logs from one or more client systems.

28.7.2 Configuring the Client System

To configure the client system, edit the RTF configuration file (*RtfConfigLinux.xml* for Linux and *RtfConfigWin.xml* for Windows) as follows:

1. Locate the line containing the tag `Network mode=` and set it's value to `"client"`.
2. Locate the line containing the tag `server_name=` and set its value to either the fully-qualified domain name or IP address of the server system.
3. Optionally, you may change the TCP port used by locating the line containing `Client port_number=` and changing its value to the port number you wish to use. Note that you must make a corresponding change on the server system (see Configuring the Server System).
4. If the System Release has not yet been started, run `dlstart`. Otherwise, cause the RTF program to reload the updated configuration file by running `rtftool reload`.

Figure 20 shows a portion of a sample RTF configuration file edited to configure the client system.

Figure 20. RTF Configuration File Edited to Configure the Client System

```
  <?xml version="1.0" standalone="no" ?>
- <RTFConfig trace="1" tracelocation="TRACE_LOG" timestamp="1" logformat="ALIGN">
    <Logfile path="$(INTEL_DIALOGIC_DIR)/log" size="500" maxbackups="10" preserve_size="500"
      preserve_maxbackups="10" duplicate_to_debug_console="0" log_format="text" />
    <StatusTrace state="off" />
    <Network mode="client" />
    <Server port_number="4567" max_connection="1" />
    <Client port_number="1234" server_name="192.168.93.227" />
```

28.7.3 Configuring the Server System

To configure the server system, edit the RTF configuration file (*RtfConfigLinux.xml* for Linux and *RtfConfigWin.xml* for Windows) as follows:

1. Locate the line containing the tag `Network mode=` and set its value to `"server"`. The value of `server_name=` must be `127.0.0.1`.
2. Optionally, you may change the TCP port used by locating the line containing `Server port_number=` and changing its value to the port number you wish to use. Note that you must make a corresponding change on the client system(s) (see Configuring the Client System).
3. If the System Release has not yet been started, run `dlstart`. Otherwise, cause the RTF program to reload the updated configuration file by running `rtftool reload`.

Figure 21 shows a portion of a sample RTF configuration file edited to configure the server system.

Figure 21. RTF Configuration File Edited to Configure the Server System

```
  <?xml version="1.0" standalone="no" ?>
- <RTFConfig trace="1" tracelocation="TRACE_LOG" timestamp="1" logformat="ALIGN">
    <Logfile path="$(INTEL_DIALOGIC_DIR)/log" size="500" maxbackups="10" preserve_size="500"
      preserve_maxbackups="10" duplicate_to_debug_console="0" log_format="text" />
    <StatusTrace state="off" />
    <Network mode="server" />
    <Server port_number="1234" max_connection="1" />
    <Client port_number="4567" server_name="127.0.0.1" />
```

28.7.4 Cautions

Following are some cautions to keep in mind when configuring remote RTF logging:

1. If the value of the `server_name` field is a hostname, the name must be resolvable either via DNS query or via `/etc/hosts`. Failure of hostname resolution will prevent remote logging from occurring.
2. Depending on the level of RTF logging enabled, application or network performance may be impacted. The impact may be more significant if VoIP technology is being used.
3. Having multiple client systems log to a central server is possible by setting the `max_connection=` parameter in the server's RTF configuration file, but this capability should be used with caution.

28.7.5 Disabling Remote Logging

To disable remote logging, set the value of `Network mode=` to `"off"`. The Intel® Dialogic® system release software ships with remote logging disabled.

RTFManager Reference 29

This chapter describes how to use the Runtime Trace Facility Manager GUI (RTFManager) to configure the trace levels and output of the Runtime Trace Facility (RTF) utility. This chapter contains the following information:

- Description 163
- Guidelines 164
- Starting RTFManager 164
- Main Window 164
- General Tab 166
- Filtering Tab 168
- Log File Filtering 170
- Advanced Tab 171

If you prefer to configure RTF manually or need a detailed explanation of what the RTF configuration file contains, refer to Chapter 28, "Runtime Trace Facility (RTF) Reference".

29.1 Description

RTF provides a mechanism for tracing the execution path of the runtime libraries for the Intel® Dialogic® system release software. All libraries that use RTF write their trace messages to a log file. The resulting log file helps troubleshoot runtime issues for applications that are built with Intel Dialogic system release software.

Trace control settings and log file formatting are set via the Runtime Trace Facility Manager. Each runtime library has several levels of tracing that can be dynamically enabled/disabled through the Runtime Trace Facility Manager.

The Runtime Trace Facility Manager allows you to do the following:

- trace the host libraries on DM3, Springware, and Host Media Processing technology
- use a graphical user interface (Runtime Trace Facility Manager) to configure trace control settings and the format of resulting log files
- use a command line utility (rtftool) to start/stop RTF tracing and incorporate RTF tracing configuration changes dynamically
- trace multiple processes and format trace output into a central data store (log file)
- dynamically configure trace options at runtime without terminating running processes
- adjust the runtime configuration, allowing you to trace select modules (libraries), clients (trunks or channels) and labels (trace categories or levels) to avoid collecting excess trace data and degrading system performance

- filter trace data, allowing you to customize the trace output so that only certain trace statements are stored
- customize the format, readability, and location of the log files
- limit the size of the log files
- define the number of rolling backup log files to keep.

29.2 Guidelines

Guidelines applicable to RTFManager can also be found in Section 28.4, “Restrictions and Limitations”, on page 154. Note that some items in this section are only relevant if you are manually editing the RTF configuration file.

In addition, here are some guidelines specific to RTFManager:

- RTFManager will remember your previous settings when opening the configuration file.
- RTFManager can be used to reload a new trace configuration into RTF while applications are running, thus allowing you to change tracing on the fly. RTF will reload the configuration XML file after you change the configuration either on the General Tab or Filtering Tab and click the **OK** button.
- RTFManager enables you to reset the configuration file to its default state (all product families and all technologies tracing at the Error level) by using the **Reset Default Settings** button on the Filtering Tab.
- Sometimes “custom” configuration files are used. RTFManager will detect whether or not the configuration file is custom. Custom configuration files are used for specific troubleshooting purposes and are not usually modified by most users. They can only be modified using the Advanced tab. For more information, refer to Section 29.8, “Advanced Tab”, on page 171.

29.3 Starting RTFManager

On Windows systems, RTFManager can be started from the Start menu. RTFManager is in the program group for the Intel telecom software (System Release or Host Media Processing). RTFManager can also be started by just typing “RTFManager” from the console since it is in the path of the operating system’s executable searching.

On Linux systems, RTFManager can be started by typing `/usr/dialogic/RTFManager` or `RTFManager` if the executable is in the operating system’s executable searching path.

29.4 Main Window

After you have launched the Runtime Trace Facility Manager, the main window appears. The main window allows you to view existing log files and set Runtime Trace Facility configuration options. The main window toolbar contains the following menu items:

- File

- Edit
- Tools
- Help

29.4.1 File

The File menu contains options for working with the log files. The File menu contains the following options:

Open
    Opens a previously saved log file.

Close
    Closes the open log file.

Save
    Saves the open log file.

Save As
    Saves a copy of the log file under a different name or in a different location.

Exit
    Closes the Runtime Trace Facility Manager.

29.4.2 Edit

The Edit menu contains options for manipulating and searching the text of an existing log file. The Edit menu contains the following options:

Cut
    Cuts the selected text.

Copy
    Copies the selected text.

Paste
    Pastes text to the selected location.

Delete
    Deletes the selected text.

Find...
    Launches the Find dialog box. The Find dialog box allows you to search the log file for alphanumeric strings.

Find Next...
    Finds the next instance of an alphanumeric string.

Replace...
    Replaces the selected text with new text.

Go To...
    Jumps to a given line number in the log file.

Select All
Selects all text in the log file.

29.4.3 Tools

The Tools menu contains options for filtering the log file that is displayed in the Runtime Trace Facility Manager main window and configuring the RTF trace capabilities. The Tools menu contains the following options:

Filter...
Launches the Filters dialog box. The Filters dialog box allows you to selectively display certain trace statements in the log file. Refer to Section 29.7, "Log File Filtering", on page 170 for more information.

RTF Configuration...
Launches the Runtime Trace Facility Manager Configuration window. The Runtime Trace Facility Manager Configuration window contains the following two tabs:

- General - The General tab is used to enable/disable RTF tracing and customize the format, readability and location of the log files. Refer to Section 29.5, "General Tab", on page 166 for more information.
- Filtering - The Filtering tab allows you to determine which libraries to trace and the trace level (Debugging, Program Flow, Warnings, Errors) for each library. Refer to Section 29.6, "Filtering Tab", on page 168 for information about using the Filtering tab.

29.4.4 Help

The Help menu contains the following options:

Help Topics
Launches the Runtime Trace Facility Manager online help.

About
Displays the version number of the Runtime Trace Facility Manager.

29.5 General Tab

The General tab is used to enable/disable RTF tracing and customize the format, readability and location of the log files.

Note: It is possible to reload a new trace configuration into RTF while applications are running. Just change the configuration on RTFManager's General Tab and click the **OK** button. RTF will then reload the configuration XML file.

The general tab contains the following settings:

Enable Global Tracing?

This check box is used to enable or disable the RTF tracing capabilities. If the box is checked, RTF tracing is enabled. If the box is not checked, RTF tracing is disabled.

Note: Enable/disable means RTFManager will modify the RTF configuration file to change certain values to enable/disable a group of modules. RTFManager will reload the RTF to let the change take effect.

Timestamp

This check box acts as a Boolean flag to determine whether or not time stamps are generated in the log file. If the box is checked, time stamps will appear in the log files. If the box is not checked, time stamps will not appear in the log files.

Log Format

This attribute defines the format of the log file. The following three values are supported:

- Text Aligned - Aligns the trace entry fields in the log file into comma separated columns. The top of each column includes a header that provides a description of the column's content. This is the default setting.
- Text Unaligned - Separates the trace entry fields in the log files with commas only. Column alignment is not done.
- Binary - Not supported by the current release.

Note: Using the Text Aligned setting makes the log file easier to read but it does not make efficient use of hard drive space. This inefficiency is exacerbated as the log file grows. The Text Unaligned format is separated by commas so it can be parsed by a spreadsheet or database program to make the file easier to read.

Logfile Directory

This attribute defines the location of the log file. This attribute is read-only.

Logfile Prefix

This attribute defines the name of the log file. This attribute is read-only.

Logfile Size

Sets the maximum size, in Kilobytes (KB), of the log file. The default setting is 1000. The size is the maximum size of a single log file. When the file reaches this size, the RTF behavior depends on the setting of the attribute as follows:

- If Maximum Backups is set to 0, RTF "rolls over" the log file, much like a circular buffer. RTF aligns the entries so that the oldest entry is always at the top of the log file and the newest entry is always at the bottom of the log file.
- If Maximum Backups is set to 1 or greater, the log file will be closed and a new log file will be created. This sequence continues until the Maximum Backups threshold is reached.

Maximum Backups

This attribute is used to determine whether or not backup log files are created. Valid values are as follows:

- 0 - Backup log files will not be created. All trace information will be written to one log file. When the size of this log file reaches the threshold defined in the attribute, RTF "rolls over" the log file, much like a circular buffer. RTF aligns the entries so that the oldest entry is always at the top of the log file and the newest entry is always at the bottom of the log file. This is the default setting.

- 1 or greater - Backup log files will be created. All trace information is initially written to one log file. When the size of this log file reaches the threshold defined in the Logfile Size attribute, the initial log file is saved and the trace data is written to a second log file. This sequence occurs until the threshold is reached.

Note: There is no limit to the maximum backups imposed by the RTF itself. However, a higher limit will increase the usage of disk space and impact performance since RTF needs to keep track of all backup files and remove old ones as necessary.

Module Width
: Allows you to customize the number of characters that appear in the log file's Module column. This attribute is only applicable when the attribute is set to Text Aligned. The default setting is 10.

Client Width
: Allows you to customize the number of characters that appear in the log file's Client column. This attribute is only applicable when the attribute is set to Text Aligned. The default setting is 10.

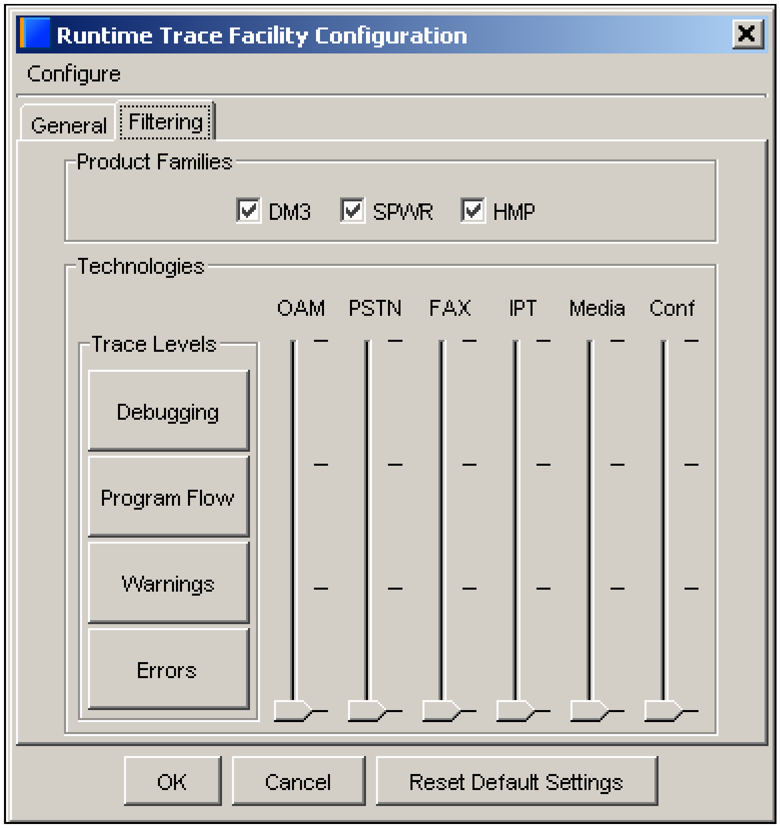
Label Width
: Allows you to customize the number of characters that appear in the log file's Label column. This attribute is only applicable when the attribute is set to Text Aligned. The default setting is 10.

29.6 Filtering Tab

This section provides information about the Runtime Trace Facility Manager Configuration window's Filtering tab, which is shown in Figure 22. The Filtering tab allows you to trace select Intel® Dialogic® System Release libraries and set the trace level for each library. This helps to avoid collecting excess trace data and degrading system performance.

Note: It is possible to reload a new trace configuration into RTF while applications are running. Just change the configuration on RTFManager's Filtering Tab and click the **OK** button. RTF will then reload the configuration XML file.

Figure 22. RTFManager Filtering Tab



The following procedure describes how to use the Runtime Trace Facility Manager Configuration window's Filtering tab:

1. The top row of check boxes represents several Intel® telecom product families (DM3, Springware, Host Media Processing). To trace a library that runs on a given product family, you must populate the check box for the product family. For example, if the application you'd like to trace uses the voice library on Springware hardware, you must check the SPWR box.

   Each technology has a slider that allows you to set the RTF's trace level. This is the Intel telecom product technology level. The technology sliders are defined as follows:

   - OAM - traces the DM3 transport layer, and also includes such things as timeslot configuration, CT Bus clocking agent, event services (fault detectors), and OAM IPC
   - PSTN - traces call control libraries (Global Call, DTI, Standard Runtime)
   - FAX - traces Fax libraries
   - IPT - traces Internet Protocol libraries (IPML, DM3 transport layer, IP call control)
   - Media - traces media libraries (Voice, CSP)
   - Conf - traces conferencing libraries (CNF, DM3 transport layer, DCB, MSI, HDSI)

2. Trace levels appear on the left side of the window. Each trace level corresponds to turning on certain labels according to the following:

- Errors - Traces the following labels: ERR1, ERR2, EXCE, and EINF. This is the lowest slider setting, so these tags are always traced.
- Warnings - Traces the WARN label in addition to the Error labels.
- Program Flow - Traces the INTF, INFO, and APPL labels in addition to the Warning and Error labels.
- Debugging - Traces the DEBG label in addition to the Program Flow, Warning, and Error labels. All trace labels are enabled at this level.

Note: Alternatively, you can click on any one of the label buttons to set all sliders to the given level.

3. When you have finished setting the trace levels, click **OK**.
4. You can then start your application (if it not already running). Trace output will appear in a log file. You can display the log file in the Runtime Trace Facility Manager main window using the **File -> Open** menu item. Furthermore, you can use the Runtime Trace Facility Manager main window to only display select trace output statements.

29.7 Log File Filtering

The Runtime Trace Facility Manager provides a log file filtering mechanism that allows you to customize the log file so that only certain trace statements are displayed. Use the following procedure to filter the log file:

1. In the Runtime Trace Facility Manager main window, select **File -> Open** to open an existing RTF log file.
2. Select **Tools -> Filter...** The Filters dialog box appears. The Filters dialog box lists any filters you currently have set up in the Runtime Trace Facility Manager.
3. In the Filters dialog box, click the **New** button. The New Filter window appears.
4. Select **Module**, **Client** or **Label** from the New Filter window's drop-down menu, depending on which element you'd like to view on the log file.
5. In the New Filter window's text box, type the name of the Module, Client or Label you'd like to view in the log file.
6. Click **OK**.
7. The newly created filter will be added to the list in the Filters window. Keep in mind that when more than one filter is shown, they are AND'ed together. For example, if you have the following filters setup:
   - Module is equal to gc
   - Label is equal to DEBG
8. Then the log file will only show the trace statements that contain the gc module and the DEBG label.
9. The log file will refresh and display its contents according to the filters you have set up.
10. If you subsequently modify or delete filters, the original data is re-filtered based on the latest set of filters. The original log file is left unchanged unless you choose to save it using the **File -> Save** or **File ->Save As** menu items.

29.8 Advanced Tab

The Advanced tab is not recommended for most users. Most users should only adjust settings using the Filtering Tab and General Tab as described above. Those using the Advanced tab must obtain specific directions on which settings to use. The Advanced tab should primarily be used by Intel developers to modify a custom RTF configuration file. These custom configuration files are used for specific troubleshooting purposes.

RTFManager will detect whether or not the RTF configuration file is custom or not. An RTF configuration file is considered a custom configuration file if it has a label other than the standard labels (ERR1, ERR2, EXCE, EINF, WARN, INTF, APPL, INFO, DEBG) and the state of the label is turned to ON (state="1"). In other words, a custom file is defined as one that does not abide by the rules set up through the checkboxes, technology sliders and level buttons on the Filtering Tab.

If RTFManager detects a custom configuration file, the only way to change the custom configuration file using the RTFManager is to start RTFManager up in advanced mode. Otherwise, the only thing you will be allowed to do is reset the configuration file back to its default and then you will be allowed to use the Filtering Tab to change the file.

When a custom file is loaded, you are warned that a custom file is being loaded and you must enable the “Advanced Wizard” to configure the tracing levels. The Advanced Wizard is enabled by running RTFManager with the `-expert` command line argument (in this case, you cannot run RTFManager from the regular start menu item but must run it manually from the command line).

A password is required to enter this advanced mode. When you enter advanced mode, the RTFManager will start and provide a third tab named “Advanced.” In advanced mode, you are presented with a tree structure of all modules and labels and you can enable or disable any of them.

The Advanced tab has six buttons for use in performing configuration tasks:

Thumbs Up
: Enables a particular lib/module/client/label. If the item is already enabled, the Thumbs Up button will be disabled and the Thumbs Down button will be enabled.

Thumbs Down
: Disables a particular lib/module/client/label. If the item is already disabled, the Thumbs Down button will be disabled and the Thumbs Up button will be enabled.

Scissors
: Deletes an item.

M
: Allows you to add a new Module.

C
: Allows you to add a new Client.

L
: Allows you to add a new Label.

When you have completed work on configuration, click the **OK** button at the bottom of the screen. You can also click **Cancel** to exit the screen without making changes.

Status Monitor Reference 30

This chapter provides reference information about the Status Monitor tool. This chapter contains the following information:

- Description. 173
- Guidelines 173
- Options. 173

30.1 Description

The Status Monitor tool enables you to track the state of the TSC as well as the state of the bits on a robbed bit or CAS line. You can use Status Monitor for both troubleshooting and administration. For troubleshooting, you can monitor the call state for problems such as hung channels. For administration, you can watch call progress and channel usage.

30.2 Guidelines

Following are guidelines for using the Status Monitor tool:

- The Status Monitor tool consumes a portion of the CPU for each trunk that is logged and may generate an exception if CTRL-C is used to exit the tool. It may take a long time to start the monitoring: about 1 minute per board.
- The CAS instance is not valid until the line is in service, so you will have to run an application or the Lineadmin and Phone tools to set the channel in-service before using the bit monitoring feature. For information about the Lineadmin tool, refer to the Administration Guide for the system release. For information about the Phone tool, refer to Chapter 25, “Phone Reference”.
- The Status Monitor tool is best viewed in resolutions greater than 1024 x 768.
- The Status Monitor tool is not intended for use with boards that are configured for ISDN.

30.3 Options

Status Monitor has the following option:

-board <board list>

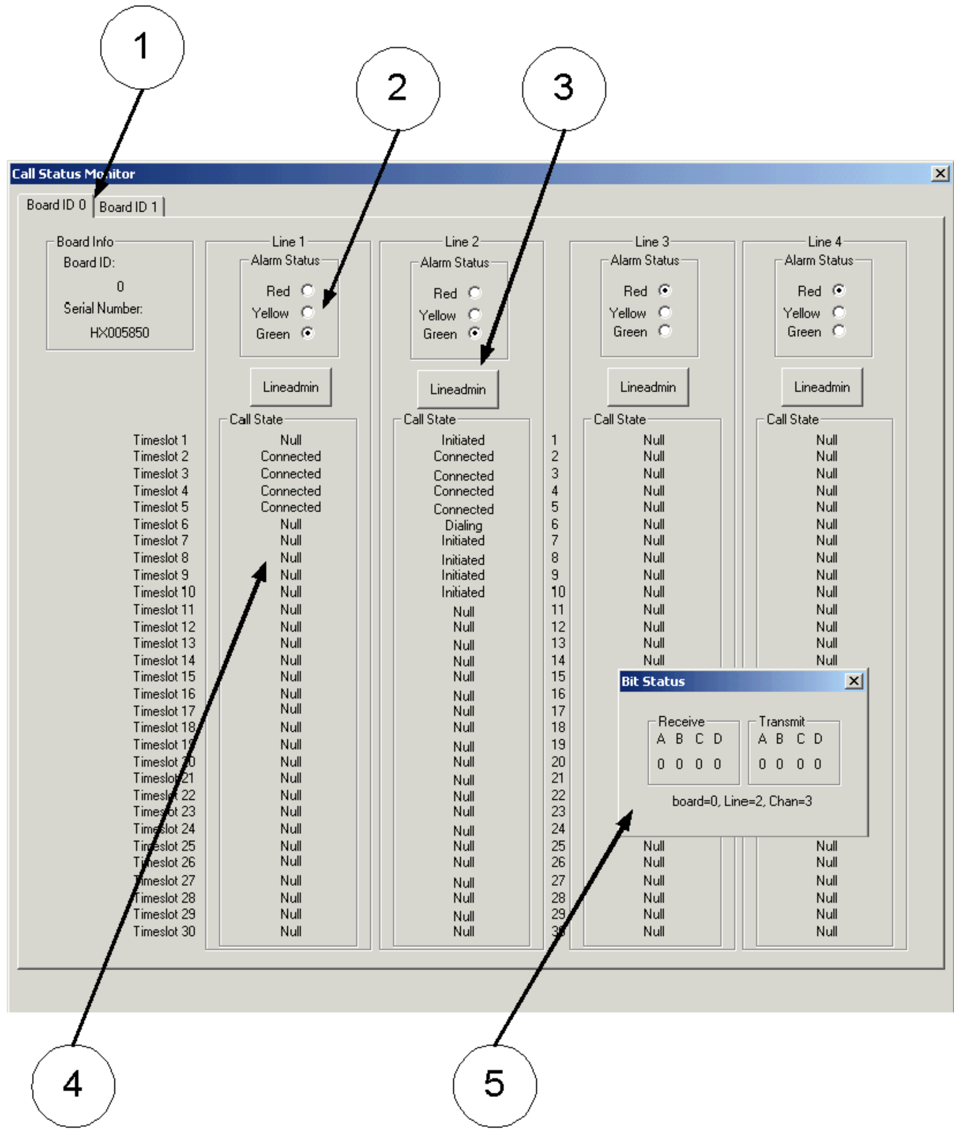
: Logical ID of the board(s) to trace (optional). The default is to monitor all DM3 boards in the system. Use the Configuration Manager (DCM) utility to obtain the board’s logical ID.

The following will run the Status Monitor tool on boards 0 and 1:

```
StatusMon -board 0 1
```

Figure 23 provides an example of output from the Status Monitor tool.

Figure 23. Example of Status Monitor Output



The following numbered list corresponds to the labels in Figure 23.

1. You can toggle between monitored boards by clicking on the tab that represents the board ID.
2. This part of the display shows the current alarm state on the trunk (red, yellow, or green).
3. Use this button to invoke the Lineadmin tool to view and set additional alarms.
4. This part of the display allows you to monitor the call state for each line on the board.
5. Clicking on a line will cause the bit information to be displayed in this window. (All 1's will be displayed for ISDN lines.)

Glossary

ANI: Automatic Number Identification. A telephone service that provides the telephone number of an incoming call. ANI is also known as Caller ID.

Automatic Number Identification: See ANI.

B channel: A bearer channel that carries the main data.

bit oriented : Communications protocols in which control information may be coded in a single bit.

CAS: Channel Associated Signaling. Signaling in which the signals necessary to switch a given circuit are transmitted via the circuit itself or via a signaling channel permanently associated with it.

called ID: A telephone service that identifies for the receiver what telephone number was dialed by the caller. This is also known as DNIS.

caller ID: A telephone service that provides the telephone number of an incoming call. Caller ID is also known as ANI.

channel: A path of communication, either electrical or electromagnetic, between two or more points. Also called a circuit, facility, line, link or path.

D channel: A channel that carries control and signaling information.

Dialed Number Identification Service: See DNIS.

DNIS: Dialed Number Identification Service. A telephone service that identifies for the receiver what telephone number was dialed by the caller. This is also known as Called ID.

Integrated Services Digital Network: See ISDN.

ISDN: Integrated Services Digital Network. An integrated digital network in which the same time-division switches and digital transmission paths are used to establish connections for different services. ISDN services include telephone, data, electronic mail, and facsimile. The method used to accomplish a connection is often specified: for example, switched connection, nonswitched connection, exchange connection, ISDN connection.

line loopback: A signal used to command the far-end receiver to loop back the received line signal.

loopback: A state of a transmission facility in which the received signal is returned towards the sender; a type of diagnostic test in which the transmitted signal is returned to the sending device after passing through a data communications link or network, which allows the returned signal to be compared with the transmitted signal for troubleshooting purposes.

loop start: Seizing (starting) a line by bridging through a resistance the tip and ring (both wires) of a telephone line. In residential installations, the loop start trunk is the most common.

metallic circuit: A circuit in which metallic conductors are used and in which the ground or earth forms no part.

metallic loopback: Metallic loopback loops the data back to the network at the physical port on the back card of a service module, whereas local loopback loops the data back to the network through the framer in the service module.

OSD: Operating System Distribution.

payload: In a set of data, such as a data field, block, or stream, being processed or transported, the part that represents user information and user overhead information, and may include user-requested additional information, such as network management and accounting information.

payload loopback: A signal used to command the far-end receiver to loop back the received payload.

POST: Power-On Self Test. A series of diagnostic tests used to verify that the DM3 architecture board components are working properly.

PSTN: Public Switched Telephone Network.

Public Switched Telephone Network: PSTN. A domestic telecommunications network usually accessed by telephones, key telephone systems, private branch exchange trunks, and data arrangements.

signaling : To set up and tear down calls, some form of signaling is required (simple examples are ringing and dial tone).

trunk: In a communications network, a single transmission channel between two points that are switching centers or nodes, or both.

wink start: A signal sent between two telecommunications devices as part of a “handshake” protocol.

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